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In This Issue—*Importance of Self Analysis*

MOTOR AGE

Volume XLII
Number 19

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CHICAGO, NOVEMBER 9, 1922

Thirty-Five Cents a Copy
Three Dollars a Year

Are You Ready for Christmas Sales?

A most appropriate Christmas gift to a motoring friend would be a full set of CHAMPIONS.

A window display of full sets of CHAMPIONS packed in a neat Christmas wrapper for the popular cars in your territory, will make many sales—as the cost is within reach of all—and the gift will be appreciated, for they will prove both sensible and serviceable.

Priming Plugs are an Excellent Christmas Gift

Our sales department will be glad to send you without charge, the proper size Christmas wrapping paper to use for full sets of CHAMPIONS. Write us today.

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"ASK 'EM TO BUY"

Dependable Champions

For Every Engine Everywhere

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THOMA SUNBEAM Visor

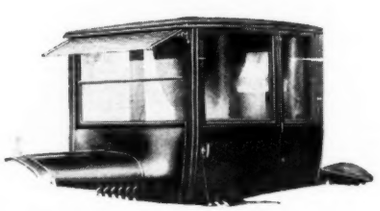
There are only a few money-making winter items for motorists — MAKE THE MOST OF THEM. Heaters, robes, chains, anti-freeze solutions, Sunbeam Visors—these are all good, but the Sunbeam Visor is exceptionally profitable because motorists appreciate in winter as at no other season, the safety, comfort and convenience afforded by the Sunbeam Visor. It is in winter that the sunlight is most glaring, reflected lights from snow and ice most dangerous.

Push the Sunbeam Visor for winter sales—and if you need help, ask for it. Every car owner in your community is a prospect for the Sunbeam Visor, and we have a definite plan for reaching them—at our expense.

Sunbeam Junior for All Ford Models

Absolutely the only high-grade visor built for open and closed Ford cars. Built exactly like the standard Sunbeam Visor—sturdy and durable, fully adjustable, equipped with genuine Thoma Process quarter-inch ribbed glass—GREEN OR AMBER. Can be installed in a few minutes; no holes to drill.

Price, either open or closed model, $8.00; West of the Rockies, $10. Standard package, 6 to a case. Order a case from your jobber and write direct to the factory for advertising helps.



Showing Sunbeam Junior Visor for Closed Fords

Manufactured By THOMA & SON INC. Everything in Glass for the Automobile **Fairfield, Iowa**

MOTOR AGE

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CONTENTS

In the Wake of the Winter Service Issue 9
By B. M. Ikert

Recent Passenger Car Developments 13

Leon Rubay Reenters American Market 14

Clean Exteriors Characteristic of European Engines 15

How Should Engine Bearings Be Fitted?—No. 2 16
By Paul Dumas

A "Mystery" Advertising Campaign That Sold Cars 20

Profits from the Electrical Shop 21
By A. H. Packer

Steering from the Maintenance Viewpoint—No. 2 22
By Paul Dumas

An Anticipationist Sells Accessories 25

Motor Age's Picture Pages of Automotive Interest 26

Editorials—

Mistletoe 28
"Graft" in Retail Prices 28
About Salesmen 28
Tires 29
Irresponsible Dealers 29

News of the Industry

October Production Reaches 244,000 30
Names of 53 New Members Elected to N. A. D. A. 32
Iowa Automotive Merchants Meet at Des Moines, Nov. 28 32
Factories Still Behind on Enclosed Car Orders 33
Motor Truck Industry in "Wonderful Shape" Now 34
Bennett Hill with Miller Motor Wins Coast Race 36
"Traveling" Enclosed Car Show Makes Debut in West 36
Hudson Essex Discontinues Four Enclosed Car Models 37
Business Notes 39
In the Retail Field 40
Concerning Men You Know 41

The Readers Clearing House

Correct Method of Burning In Ford Bearings 42
Cylinder Grinding Shop 43
Proper Way to Align Wheels 44
Theory of the Planetary Gearset 45
Using an Oakland Switch on Chevrolet 46
Power Curves 47

The Accessory Show Case 48

Service Equipment 49

Coming Motor Events 50

Squeeks & Rattles 50

Specifications of Passenger Cars, Trucks and Tractors 51

Index to Advertisers Next to Last Page.

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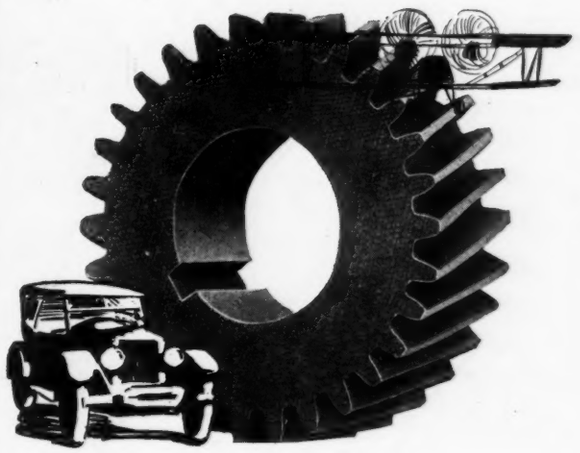

Proved by Test

Two Mitchell Cars, in sealed hood tests—10,000 miles over all kinds of roads, rocks and ruts—jolts and jars—through all kinds of weather—under every conceivable condition. There is a test that tells the story of

CONDENSITE
CELORON
Silent Timing Gears

The performance of these sturdy, non-metallic gears in the Mitchell and in many other well known makes of high grade cars, proves their superiority.

Banish the noisy timing gears from your car now. Install Celoron silent gears, the gears that eliminate the grind of metal upon metal, that cushion the shock of gear upon gear; and that help lengthen the life of every part of the motor because they absorb shock. Your local dealer, authorized service station or garage repair man can install them. If they can't supply you, write us direct.

Diamond State Fibre Company

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The Trick Timer and the Glittering Guarantee

(A FABLE)

ONCE there was a high-pressure Salesman, whose line of chatter could sell a Victrola to a Deaf Mute.

He was peddling a Trick Timer for Fagged Fords, and he was going Big. Even some of the wisest Dealers fell for his Solo about the Swell Guarantee on his Timer. When they came to, he had them in the Book for another shelf-full of sale-proof merchandise.

This bird's Timer was "guaranteed" against everything for Life. If it didn't cure misfiring, corns and Rear Axle Trouble, you could return it and try to get your Money back. Back of this Guarantee was a Blacksmith Shop camouflaged as a Factory. But the Guarantee was a Dinger, and the Timer was Different and very Scientific.

So business was swell for Friend Salesman—until Dealers found that the Trick Timer would do everything but *Sell*, and the Guarantee didn't cover *that*.

Now they are concentrating on the *Milwaukee Timer* — and the salesman has gone back into the Bootlegging Business.

MORAL: It's not the Guarantee, but the House behind it, that counts.

MILWAUKEE MOTOR PRODUCTS, Inc.
MILWAUKEE, WISCONSIN
(TIMER BUILDERS FOR OVER 17 YEARS)

MILWAUKEE TIMER for FORDS

Sells Fast at $2.00

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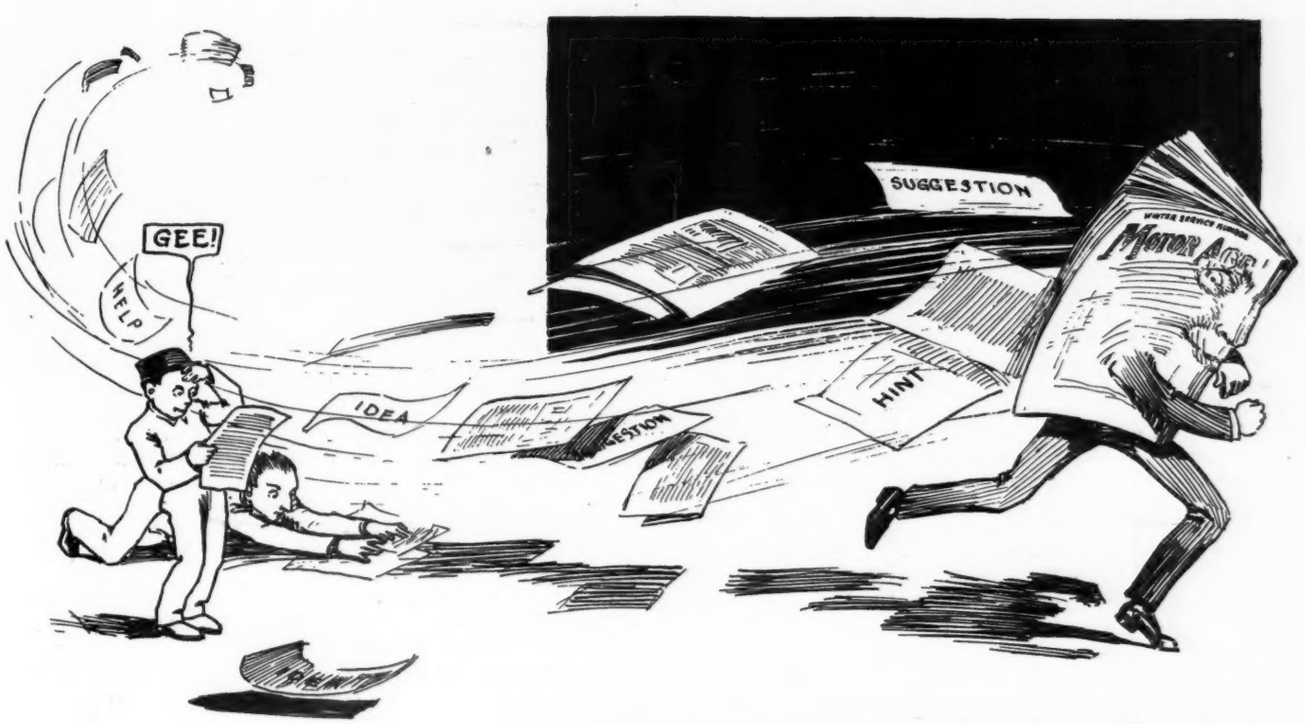
MOTOR AGE



"Gee, I guess it's up to me to find out where I stand." That is probably what many dealers will say when they find out that big opportunities lie ahead if they take advantage of suggestions intended primarily to make their business better and more profitable

In the Wake of the Winter Service Issue

Self Analysis Is the Final Answer to Question of Making Good in the Automotive Maintenance Business

By B. M. IKERT

LAST week we presented to our readers the annual Winter Service Issue. It is intended that this issue shall reach the dealers at a time when they are turning their attention seriously to the cold weather tasks in connection with their business.

MOTOR AGE is rather proud of the Winter Service Issue because it is felt that there has been brought together in that issue a great deal of practical information which can be applied wholly or in part to the establishments of the large and small town dealer alike.

Just how much good the dealer will get from the issue depends to a large extent upon how well he studies it with the thought of applying much of the information to his business as warranted by his surroundings. Attention has been paid to making this issue especially, a reference book rather than a regular issue of a weekly business paper.

We have tried to present the material in such a way that it can be applied readily. While some of the matter is more or less theory, in the main, it is tied closely to practical suggestions. But, the issue will be of little avail if the dealer is not induced to act when he has finished reading it and when

he has turned it over to his associates. We have made our move by handing you this Winter Service Issue. The next move is yours.

We feel sure the dealer in the large city is going to profit from the issue and likewise we feel the dealer in the small town or rural community will be able to extract many things from it to better his business. The small town dealer can do many of the things which have proved successful for the large city dealer, at least he can enter into the spirit of them. Here, strange to say, we have generally noticed that the successful dealer in the big city, though he may be making a good profit, usually studies a special effort like the Winter Service Issue, more carefully than the small town dealer. If the successful, big city dealer sees fit to study his business paper carefully, is it not natural to infer that the small town dealer would do well to do the same? It is his paper, too, and realizing this fact, MOTOR AGE in its presentation of the Winter Service Issue, directed its editorial matter that it might be universally applied for the good of the maintenance department of every class of dealer.

Just a week ago our readers received the Winter Service Issue and we dare say many of them have already undertaken some of the things suggested therein. Or, they may have gained a different conception of the vastness of the field of maintenance.

Maintenance Has Outgrown Manufacture

We read in the article on the future of this business that the maintenance industry, according to figures of two years ago, had outgrown the manufacturing end of the automotive industry. We saw from the curve presented that in 1930 we probably shall have some 17,000,000 automotive vehicles registered in the United States. And, all of them requiring maintenance!

We read in this article how some of the old beliefs that the automotive man could not handle the tractor, the motorcycle and even the motor boat are being dispelled especially by men in the shops of the small city dealer. Many automotive shopmen have saved the day for the farmer or summer resort operator by being able to carry out a much needed repair to his tractor engine or marine engine.

The tourist has helped to broaden the activities of the dealer's maintenance department, because today the shop of such a dealer is called upon to work on all makes of automotive vehicles. This clearly indicates that our maintenance men must be students. They must learn the fundamentals, for instance, of electrical systems as applied to cars and trucks. This makes it vastly easier to work on a car when the electrical system is more or less foreign to them.

The article on the future of maintenance clearly indicated that the fundamentals of maintenance, whether for car, truck, tractor, motorcycle or motor boat, are pretty much the same. Thus we find the motorcyclist depending more and more upon the automotive dealer shop for his maintenance. One of the timely things therefore, that the dealer, especially in rural districts, can do is turn his attention to this idea of a well rounded out maintenance department to handle a variety of work.

Such a concentration of service leads to wider dealer lines with the progressive merchants. It requires a very popular car to support an exclusive dealer in the small city. That is why we find a dealer with a varied line—cars, trucks, tractors, or cars, motorcycles, and isolated lighting plants, particularly in the agricultural districts. The lead article in the Winter Service Issue made plain that it is just as easy, for instance, for the automotive shop to weld a part from a binder or farm implement as it is for that shop to weld an axle housing or crankcase. You will recall the article said:

"It is service that the farmer wants and he does not relish that his harvester shall be idle with ripe grain fields waiting, just because the implement dealer must telegraph to a distant city for that particular part. A welded part will do him just as well, and so this work is drifting to the man who has the equipment."

The future of maintenance will mean that more transportation will be gotten out of a vehicle than formerly. This will be brought about largely by devoting as much work to the body, upholstery, top and finish of a car as is usually put on the chassis nowadays. Too many cars have gone to the junk pile or joined the ranks of "old models" long before they have given to the motorists the transportation the manufacturers have put in to them.

Keep Exterior of Car Looking Good

Many have heard the expression from a car owner "I don't care how she looks, just so she runs all right." And, the maintenance man has largely let it go at that, generally because he was not equipped to maintain the outside of a car as well as the hidden parts. There is every good reason to keep fenders, bodies and top in repair, just as we renew worn steering parts, wheel bearings or clutch facings.

As was brought out in the lead article last week it is foolish to do a repair job running into $300 on a popular priced car if the body of that car is in such shape that a person looking for a used car would not pay more than $400 for the car. A $500 chassis with a $50 body on it is likely to be worth only $50 to the consumer. We think you get the point.

The article went on to state that there is more and more tendency these days for the automotive dealers in the small towns to finance body renewal plants. In this way they protect their investments in chassis work and give to the buyer of a new car some assurance that his car, after some use, will have a market value because the maintenance facilities of the community are prepared to socialize the used car to the degree that more transportation can be put into the used chassis.

Many new cars have been sold directly though the back door of a dealer's establishment. All of which simply means that by selling maintenance properly on the vehicles he has sold in his territory the dealer builds up a clientele of satisfied customers which help to sell his cars.

Responsibilities to the buyers must be met and no longer can we look upon the dealer's business as merely that of selling cars or any other type of automotive vehicle. Factories are demanding a better class of maintenance from their representatives. The automotive maintenance industry cannot be looked upon any longer as merely a repairman's job. That work is only incidental and only a small part of the general plan toward organized efforts to keep a product sold.

One of the things we should like to call attention to in this article on the future of automotive maintenance is that of paying more attention towards the displaying of maintenance establishments. Certainly the dealer who has some 3,000 cars or so running in his territory and a well-equipped maintenance department to handle the work on these cars should make it a point to take every one of his new car customers through his shop. The same applies to all dealers they have a less number of cars in their territory.

We read in this article that the size of the shop is not nearly so important as its workmanlike appearance. A prospect will soon appreciate the difference between a good shop and the "gyp" shop. All the newspaper advertising you might do about "first class work," won't mean half as much as displaying first class shop facilities.

Unless something unforeseen happens the next year should be the best in the history of the automotive industry.

Certainly the dealer could not help feeling inspired after reading the article on automotive buying in the Winter Service Issue. The dealer alert to opportunity will start now to get ready for the great buying period which is at the threshold of the industry.

Big Opportunities Ahead for Dealer

We read in Shelton's article that farm prosperity is returning, that business in general appears to be entering a flourishing era, that the south has a 36 per cent greater cotton crop this year than last, that never in the history of the industry have we seen such wonderful car values a present prices, that the truck and tractor have a vast potential market, that hundreds of millions of dollars are being spent on roads and that huge sums are being spent on maintenance of automotive equipment as never before.

If we are to apply practically the matter set forth in this article we must of necessity give serious thought to the main-

tenance problems as they become more involved in the ever increasing number of automotive vehicles.

The dealer, especially in the rural sections, must in the coming year study his surroundings. He must be able to talk in the language of the farmers and of the merchants in town. At all times he must know the place of the industry in the economic life of the country.

There will be some 2,000,000 new automotive vehicles placed in the hands of owners by the end of this year. Every one of these vehicles will need maintenance work sooner or later.

It is true that the economic conditions of the country influence the dealer's business, but in the final analysis, the automotive merchant alone is the one who must put forth the effort to make business better. The flourishing period predicted for next year will mean vastly more to the dealer who gets in shape for it now. What if a dealer does sell an enviable number of cars next season and does not prepare to increase his maintenance facilities proportionately?

It is entirely possible for a dealer to find out how many cars, trucks or tractors the county in which he lives ought to have in it and how many it has now. Then he is in a better position to shape his future plans. We feel certain every dealer who reads the article "National Pocketbook is Open for Automotive Buying" will get his house in order now that he may be ready for the opportunities of 1923.

In the Almanac for Automotive Dealers there are so many excellent and pertinent suggestions, we rather feel that our readers will want to close the book when they get through reading them and start right in doing the things without reading the rest of the matter in the book.

Practical Suggestions in Almanac

It would not be such a calamity at that, because if the dealer faithfully followed out the suggestions for every day in the Almanac we venture to say he would be in pretty good shape by spring to handle the increased business predicted for 1923.

You have been entertained, no doubt, by reading through the Almanac, but do you know that there is contained therein practically a recapitulation of all that has appeared in MOTOR AGE in the last year or two? If you have failed to read MOTOR AGE during the last year, it still is not too late, because you can read the Almanac again and get the highlights of most of the articles which have been published for the betterment of the maintenance industry.

The Almanac embraces everything from snow removal and opening the drain pipes on your roof to preparing an ad for the newspaper. It is literally a notebook the dealer himself might have prepared last summer when he resolved to make a lot of improvements this winter. The suggestions all are practical and can be applied by large and small town dealer alike.

Winter is the best time to make alterations in the shop and for that reason we included in the Winter Service Issue the laying out and equipping of a small machine shop. The general plan of the shop and the selection of equipment was chosen only after a great many shops, both large and small, had been studied.

It was realized that when a shopman wants to build a bench or similar piece of equipment, he wants to know how long to make it, how to make the tool drawers and similar definite parts. To save him a lot of figuring we have put the dimensions on all the pieces, shown how to fit the various parts together and where to put the apparatus in the shop.

We shall feel repaid for our efforts in getting this material together for our readers if they appreciate the advantages gained from having a neat and businesslike shop. The larger shops in the country usually are handled pretty well, but too often the small shop is untidy, insufficiently equipped and lacks shop morale. Candidly, we cannot see how the average shop which intends to do a general repair business, as it must in the smaller communities to keep busy, can get along without any of the equipment suggested in this article. If some of the equipment must be dispensed with, and if there is a good machine shop in the vicinity, then let the non-essentially equipment be the lathe, large drill press and perhaps one other tool.

Certainly every shop can afford a good bench, tool cabinet and other pieces of shop furniture which can be built during periods when work is not so heavy. Often a rearrangement of the shop will make a difference in its appearance and efficiency.

Many dealers and maintenance men, who reside in sections of the country where snow closes the roads for several months out of the year, will do well to read the Winter tale on page 24 of the Winter Service Issue. There they will find an answer to their frequent question, "How can we get work into the shop before the roads are closed up?"

Dealer Must Know Community

It goes back to the article on automotive buying in the same issue, wherein the author stated that only the dealer who knows intimately the people among whom are his prospective customers can make the final analysis of conditions and then take steps to make business better.

There usually is plenty of winter repair business to be had in rural sections, but the trick is, as was so ably expressed in the tale of Winter, to get the work in before the snow is too deep. Naturally a man is going to drive his car as long as the weather permits in the snow areas. But talk of special price reductions on the work will often induce him to "lay her up" a week or two earlier. Once his car is in your shop he does not care. He is glad it is being repaired. So much snow, he can't use it anyway. It is not too late now to get tractor engines into the shop and, if you are near a summer resort, maybe a few marine engines that need overhauling can be picked up. Don't let "Old Snow" have the laugh on you.

As a reference book on some vital mechanical subjects the Winter Service Issue will be found invaluable. We showed in that issue that there are profitable opportunities in the repairing of radiators, once the basic factors underlying engine cooling are known and the wide awake shop has acquainted itself with the various types of radiators and their methods of repair.

It often has been said that the small shop cannot do radiator repair work. While it is true that radiator repairing involves certain special equipment for best results, it is equally true that, given the right equipment and knowledge of the work, the small shop can do quite a profitable business along this line. The big secret seems to be to know how to solder well and to understand radiator construction.

MOTOR AGE has tried to take the mystery out of many of the things which the automotive man has considered mysterious. In the old days, for instance (and it is true to a large extent now) the average shop man thought the electric systems on cars hopeless when it came to diagnosing trouble. But the men in the industry today rapidly are learning of the functioning of the coil, the condenser, generator armature. Many, who knew nothing about these things formerly, now can repair electrical apparatus of all kinds. Why? Because they have mastered the fundamentals of the electric systems.

In the same way we think the shopmen must get better acquainted with radiators and their repair. The wide awake man always will welcome a chance to acquaint himself with the backgorund of his work.

We realized many of our dealers are busy men and go through an issue like the Winter Service Issue rather hastily, leaving it to their assistants to peruse the articles more carefully.

To remind our busy readers of the Winter tasks we presented the picture section in the Winter Service Issue. This section hits most of the high spots, about which the other articles go into detail.

Winter Tasks Shown by Pictures

Thus, in the picture section an appeal is made for snow removal, certainly an item worthy of the attentions of every dealer. Maybe you got a suggestion for your show windows from the second page of the picture section. Then there were the pictures of some rest rooms and salesrooms, all chuck full of suggestions. We have frequently told our readers about making their places more attractive, so in this section we took two photographs of rather unkempt places and showed

by sketches what could be done to improve them. You will notice that the changes we suggested would not involve much expense.

The tow car helps to keep the shop busy and so we showed a few of them. Then, you will recall, we presented in another part of the issue complete plans for making a tow car. Most dealers have on hand an old model car that would make an excellent tow car. A few "pulls out of the ditch" will pay for the cost of making the body and besides, you generally get the job of fixing up the wrecked car, if you have "sold" your service well.

Other pages in the picture section showed how to call on a prospect to sell him a closed car, how to prepare a newspaper ad, to telephone for business. All of these things have proved profitable for some dealers and they are things which can be applied by any dealer, whether he lives in a large or small city.

The shop views certainly should prove inspirational to readers who are planning to make alterations or build a new shop. Above all note the cleanliness in all the shop views and the orderly arrangement of machine tools and other apparatus. Maybe you can't have as much equipment as shown in some of the pictures, but you can keep what you have in an orderly fashion. The shops in which these pictures were taken have proved that it pays to be neat and clean to insure good results and make maintenance pay.

Somebody is going to give somebody a car for Christmas this year. Maybe you can interest some of these people by an effective Christmas display window. Some examples were shown in the picture section.

Many Articles of Practical Value

Another practical article in the Winter Service Issue from which the maintenance man can get a good background for his work is the one on steering from the maintenance view point. What was said about radiator repairing applies equally well to steering gears. There is much the maintenance man must know about steering mechanism and while it is true that he is chiefly concerned in such things as adjustments, remedies for wheel wobble and replacement of worn parts, he should know something about steering in general and why he does certain things to insure good maneuverability of a car.

In order, too, to make this article as valuable as possible, the author goes into detail on each make of steering gears, as to its lubrication and adjustment. This information is invaluable to the maintenance station because, should a tourist come in some time with a car equipped with a steering gear to which the mechanic is not accustomed, he can by referring to this article find ready means for affecting the proper adjustment or repair.

Have you considered paint as an aid in selling the used car? Why go to work and recondition a chassis and not touch the finish of the body? Merely painting the body of a used car will not solve the used car problem, but it should be considered on a par with the chassis work. As was pointed out, in the Winter Service Issue, on the subject of painting, many a dealer has been stuck for a heavy loss on a car that had the making of a good vehicle, because he put all his work on the chassis and forgot to recondition the body.

In the "Six Fundamentals of Tractor Selling," one Iowa dealer made the statement that he found the men in his shop were fully competent to take care of tractor service. He said it was simpler than maintenance work on motor cars. The common tractor magneto is the simplest of all ignition devices and a magneto and a few short wires is all there is to tractor ignition. Then there is nothing but the simplest type of four cylinder engine with which most mechanics are familiar.

Take the Mystery Out of Tractors

This Iowa dealer has taken much of the mystery out of the selling of tractors and the maintenance required by them. He says the trade is coming back and when it does, he will be ready for it. Already we have learned that farm prosperity is returning. It means the sale of more tractors and other automotive equipment for the farm. Are you ready for it, like this Iowa dealer?

Among the profitable winter tasks is that of selling and installing seasonable accessories. But these accessories must not be tucked away somewhere in the stockroom in the hope that some day some car owner will come along and buy some of them. Keeping a car in a cold garage, getting an engine to start more easily in cold weather, keeping the drivers and passengers warm, all present opportunities for the dealer's maintenance department. The article on winter's effect on electrical and accessory sales goes into detail about the things the maintenance man should know about winter devices that can be profitably sold and installed. It is especially valuable information for the small town dealer, because most of the cars in the large cities are kept in heated garages, whereas most cars in the rural districts have to face the rigors of an unheated garage.

The electrical systems of automotive vehicles need special attention in Winter because storage batteries are affected by a drop in temperature. The supplement to MOTOR AGE of last week, embracing the various methods for increasing generator output to meet winter conditions, by this time probably is adorning the walls of the dealers' shops. That is as it should be. The chart is a part of the reference book, as we often allude to the Winter Service Issue. It is as necessary to generator charge adjustments as a valve timing diagram is to a man who wants to tune an engine properly.

Winter is the time when engines are given a complete overhauling. Bearing work probably is the most important single item in connection with engine overhauling. The article telling how bearings should be fitted has been compiled from the latest practices of modern factories and shops. Factory methods cannot be transplanted bodily into the dealer's maintenance shop, but the mechanic who is fortified with the basic principles of alignment and circularity so necessary in bearing work, is bound to do a better job than the man who works in the dark.

Earlier in this article we said that the man who has a good background of the industry he serves, will do his work better. Occasionally it is well to go a little on the outside of the direct fields of activity and see what is going on. That is why we gave you, in the Winter Service Issue, the review of racing car construction.

They are doing many wonderful things in racing engines and some day some of these things will be reflected in the engines of our passenger cars. Many of them are now, for that matter.

The Maintenance Data sheets prepared for the Winter Service Issue, like the chart of generator charge adjustments, should be kept on hand for ready reference, because they embrace information invaluable in winter maintenance activities. When anti-freeze solutions are prepared, it always is a question "How much does she hold?" The data sheets will tell you this. They will make it easy, too, to find the correct sized fitting to go on the exhaust pipe of a car when installing a heater or cut-out. In overhauling a chassis, when you want to order new shackle bolts for a car or truck, you can get the exact size from the data sheets. And, have you ever thought to use the data sheets for finding out that certain parts of cars are interchangeable. For instance, you may need a shackle bolt for a certain make car. You have none in stock. You look at the data sheet and find that a bolt fitting the Runwell car fits the car you want. You go to the Runwell dealer's place in your town and get one.

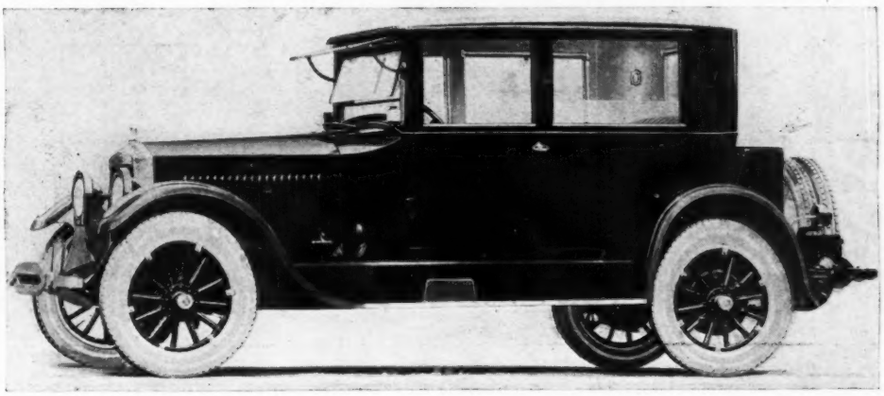
Everything Depends Upon Dealer

In summing up our trip through the Winter Service Issue we must come back to the thought that after all, the dealer himself is the answer to the question as to how much good an issue of this kind does. If he does not find out where he stands, if he does not realize the necessity for self-analysis, if he does not put forth effort to take advantage of the opportunities ahead, he is out of the race so far as keeping up with the leaders is concerned.

The dealer alone must make the final analysis and find out where he fits into the picture which has been painted for him.

Recent Passenger Car Developments

Studebaker Five Passenger Coupe

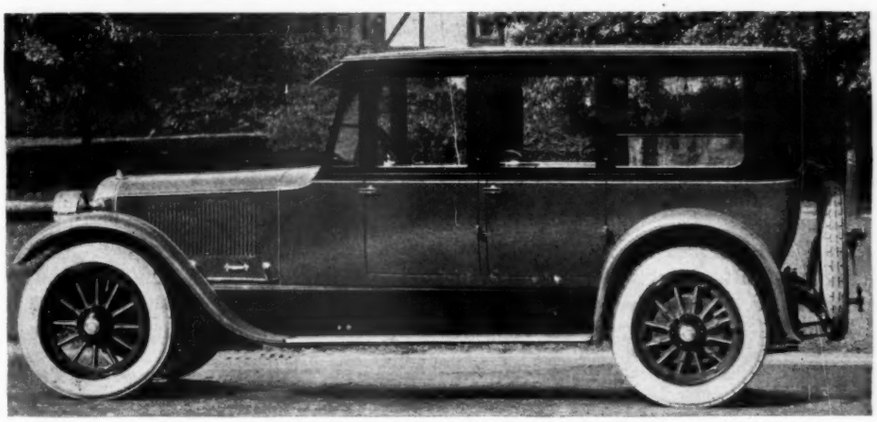


A five-passenger Big-six Coupe is announced as an addition to the Studebaker line. The new model is priced at $2375, f.o.b. Detroit, including such features as nickel-plated front and rear bumpers, automatic windshield wiper, rear-view mirror, motometer and ornamental radiator cap. Its appearance is further enhanced by nickeled radiator shell.

The new coupe has a two-door body. Upholstery is of rich dark brown velour, with floor carpets, top lining and trimmings in harmony. A close-coupled effect is obtained in the seating arrangement. A folding seat is provided opposite the driver for the fifth occupant.

Other features of comfort and convenience include heater, thief-proof transmission lock, ventilator in cowl, automatic window regulators, silk roller curtains, three-piece rain-vision windshield with rain visor, jeweled eight-day clock, door lock and door pockets. A trunk is provided at the rear for luggage.

Illumination includes headlights, coach lamps, courtesy light on driver's side and opalescent corner reading lights.

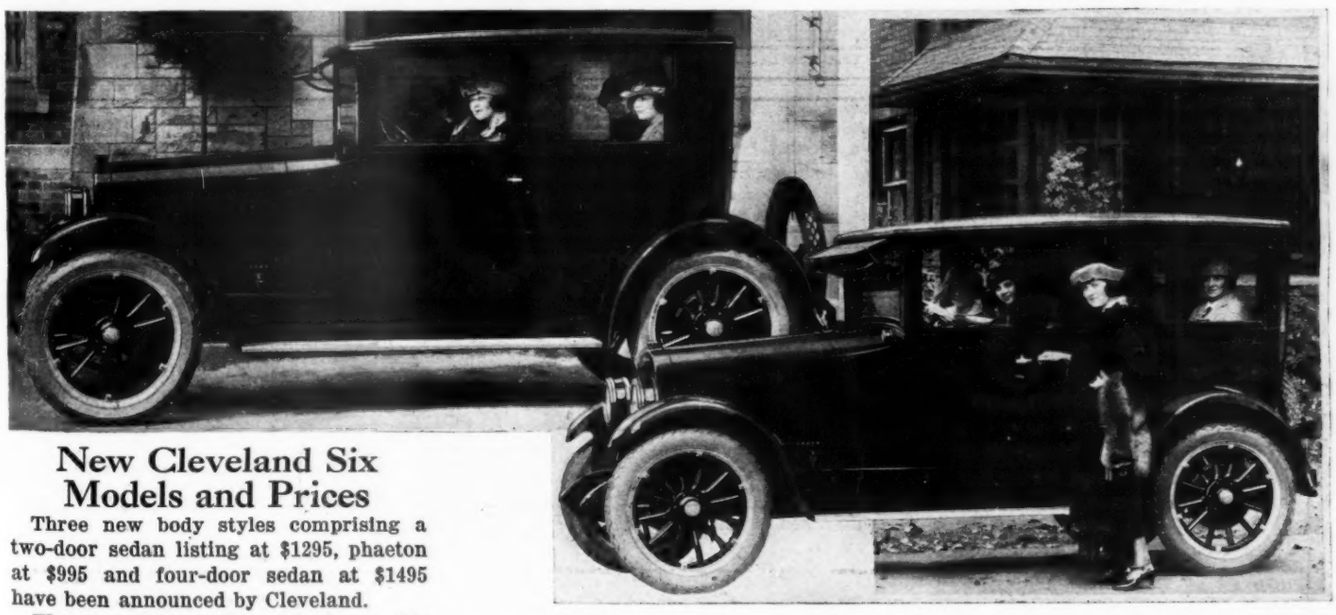


Seven Passenger Winton Sedan

A new sedan, mounted on the Model 40 chassis, has been added by Winton.

The seven-passenger model shown in the illustration, with the customary seating arrangement is fitted with unusual taste and the upholstery reveals a new note in design being a departure from the standard French pleats.

The windows are large giving excellent range of vision, door and rear quarter windows operated by silver-mounted crank regulators. The door handles are ebony with a silver trim.



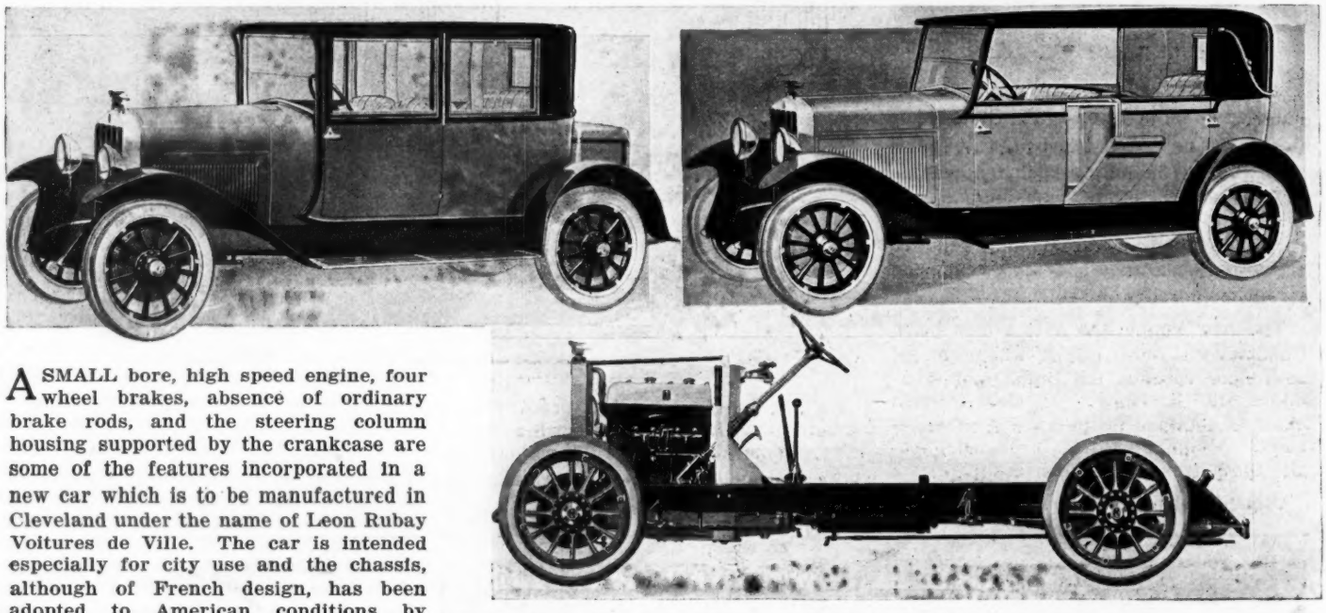
New Cleveland Six Models and Prices

Three new body styles comprising a two-door sedan listing at $1295, phaeton at $995 and four-door sedan at $1495 have been announced by Cleveland.

The two-door sedan displaces the coupe, long featured by this company as one of its enclosed car styles. According to factory officials, this latest Cleveland two-door sedan was created to meet the public's demand for a compact five-passenger enclosed car listing at practically open car cost.

Like the two-door sedan, the phaeton and four-door sedan hold a strong price appeal. Both of these models carry a appeal. All of these models are mounted on the standard Cleveland Six chassis.

Leon Rubay Reenters American Market



A SMALL bore, high speed engine, four wheel brakes, absence of ordinary brake rods, and the steering column housing supported by the crankcase are some of the features incorporated in a new car which is to be manufactured in Cleveland under the name of Leon Rubay Voitures de Ville. The car is intended especially for city use and the chassis, although of French design, has been adopted to American conditions by American engineers.

The chassis has a 118-in. wheelbase intended to facilitate maneuvering in traffic, a small four cylinder, 2¾x5¼ in. high speed engine, said to be capable of developing 36 hp. at 3,000 r.p.m., single plate clutch running in oil, conventional gearset mounted as a unit with engine, full floating axle with stamped steel housing, four wheel brakes operated by steel ribbons, and an aluminum dash.

Only closed bodies of Rubay design and construction will be used. These will include a four-passenger coupe, six-passenger sedan, berlin, cabriolet and brougham.

The engine is a clean design, has cylinders with ⅞-in. offset, separate head with integral manifolds, overhead valves and camshaft driven by helical bevel gears, and a concealed water pump. Air supply for the Stromberg carbureter is drawn over the exhaust pipe and through the cylinder block. This passage communicates with the crankcase so that a slight vacuum in the latter tends to prevent oil leakage.

The cylinder barrels extend well into the case and the cylinders are attached with internal studs, so that no external connections appear. Lubrication is full force feed through hollow crankshaft and camshaft. The crankshaft of chrome nickel steel is carried on three main bearings. Connecting rods are of forged Lynite, pistons are cast Lynite with three concentric rings.

A vacuum tank is carried in a recess in the aluminum dash. Bosch electric units are employed. Starter and generator are supported beside the gearset, the generator having chain drive with eccentric mounting for adjustment.

Braked drums are of aluminum with steel linings for the expanding. Thermoid covered aluminum shoes to bear against. Drive and torque are taken by a torque tube. The differential carrier is attached to the rear cover plate. The axle gears give a 5.1 to 1 reduction. Both front and rear wheels are carried on Timken bearings. They are of wood and have Firestone rims.

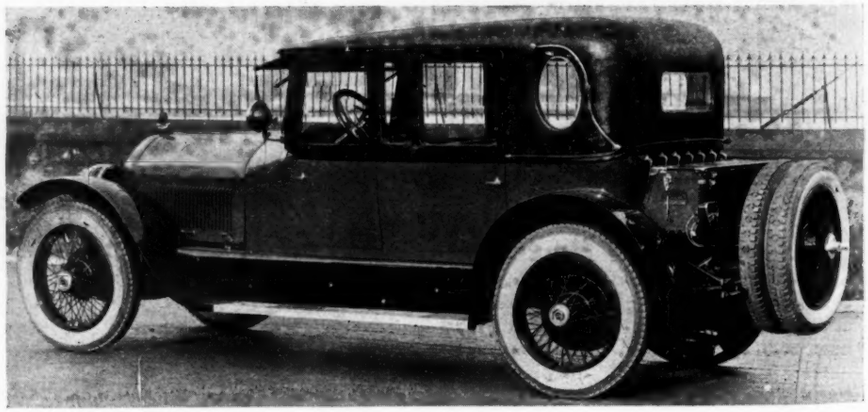
The front axle is forged from chrome nickle steel. The shafts for operating the front wheel brakes are carried in the channel forming the rear part the I-section, the cams being in the lower part of the drums. Both sets of brakes are pedal operated, the rear set being also hand operated.

Springs are low and normally flat. A special spring mounting is used, both front and rear. The front end of the front spring is attached to the frame by the conventional eye and bolt. The rear end of the spring is flat and is carried between two hardened rollers mounted in a cast steel spring bracket. The same type of mounting is used for the front end of the rear spring.

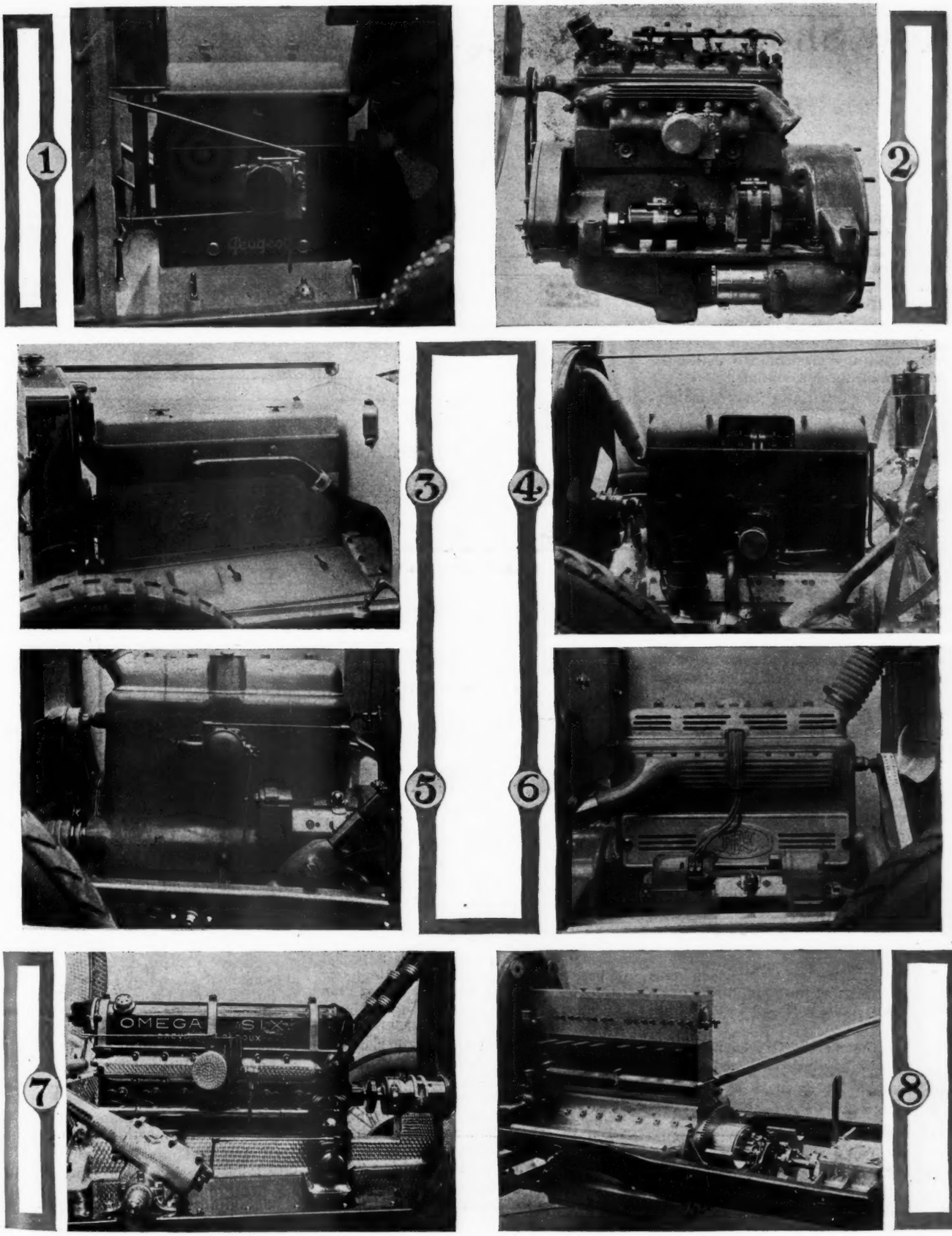
It is planned that the new cars will be exhibited for the first time at the New York Salon in December.

Special Top Designed for Stutz

Another good example of where a distributer has dressed up a car after his own design is the Stutz, shown above. This car carries a top designed by F. D. Cerf, manager of the Chicago Stutz Co.



It is of patent leather with glass sides, removable, of course, for summer use when curtains are installed. The interior of these cars has also been somewhat improved by Cerf, who has covered the seats and door interiors with gray velour, finishing the interior of top with the same material in a shade to match the upholstery work. In addition to the top, the Chicago company has added a spare tire and wheel, oversize tires, a sun visor, the trunk with two suitcases and an emergency compartment for baggage.



Clean Exteriors Characteristic of European Engines

1—The 11-hp. overhead-valve Peugeot engine. 2—New Hotchkiss 12-hp. L-head engine. 3-Fiat six, water pump, generator and magneto are inclosed by an aluminum cover plate. 4—Note the accessible units on the Brasier. 5—6—Two views of the F. N. which has aluminum cover over plugs. 7—The Omega Six, a 122-in. engine. 8—Bugatti straight eight.

How Should Engine Bearings Be Fitted—No. 2

The Cause of Chronic Loosening. Shaft Should Be Tested for Contact Before Making Adjustment. Using the Mandrel

By PAUL DUMAS

THE first installment of this article reviewed the current factory processes for fitting engine bearings. The necessity of circularity and alignment was emphasized as being the first essential of a good bearing job.

The contents of this, the concluding installment, outline the simple tests that will enable any mechanic to determine and maintain these essentials.

It is believed that nearly every maintenance operator has done some bearing fitting and is acquainted with the hand scraping method. There are some, however, who have been puzzled by the erratic results produced by an apparently first class job of fitting.

This office frequently receives letters from various parts of the country telling of engines that chronically develop loose bearings or that burn out a bearing soon after its installation. The fact that in practically every instance the trouble has occurred on cars of recent vintage excludes any probability that the real cause can be traced to the design of the engine. It is an actual fact that, in every case that has been brought to our attention, the trouble was ultimately traced to one or both of the basic ideas previously mentioned—**alignment** and **circularity**—or rather to a lack of one or both of these factors, assuming of course that the lubricating system is in good order and all passages unobstructed. To fully appreciate the importance of these two, the following random suggestions are offered. These suggestions are submitted on the basis that a clearer conception of cause and effect will be of greater benefit than iron clad instructions.

Lack of alignment or misalignment of the crankshaft and connecting rods takes place generally, when the following operations have been performed on the engine:

Engine Completely Overhauled and New Bearings Installed.

Adjustment Has Been Made on One of the Main Bearings by Tightening the Cap.

In the first operation listed, misalignment can be traced to the following specific items:

The backs of the upper case bushings do not have good contact with the holes or seat in crankcase. This poor contact is probably due to a distorted half bushing, or to a bushing having a different curvature than the curvature of bearing seat in case. Either condition would manifest itself only after the bearings had been subjected to the pounding action of the pistons through a period of usage. The result would be that one of the upper halves would be higher than the others. This condition would leave a portion of the shaft unsupported.

The second is an effect rather than a cause and occurs when the crank shaft bearings are adjusted from below, when one or more upper bushings are out of alignment. Tightening the bearing cap when the shaft is unsupported, due to misalignment of the upper hales, will spring the crankshaft. This is a point that can not be too greatly emphasized because the indiscriminate tightening of the bearing caps has been productive of more than one case of chronic bearing trouble.

Before adjusting the crankshaft bearings of any engine we would advise that the shaft be tested for contact, as described later in this article.

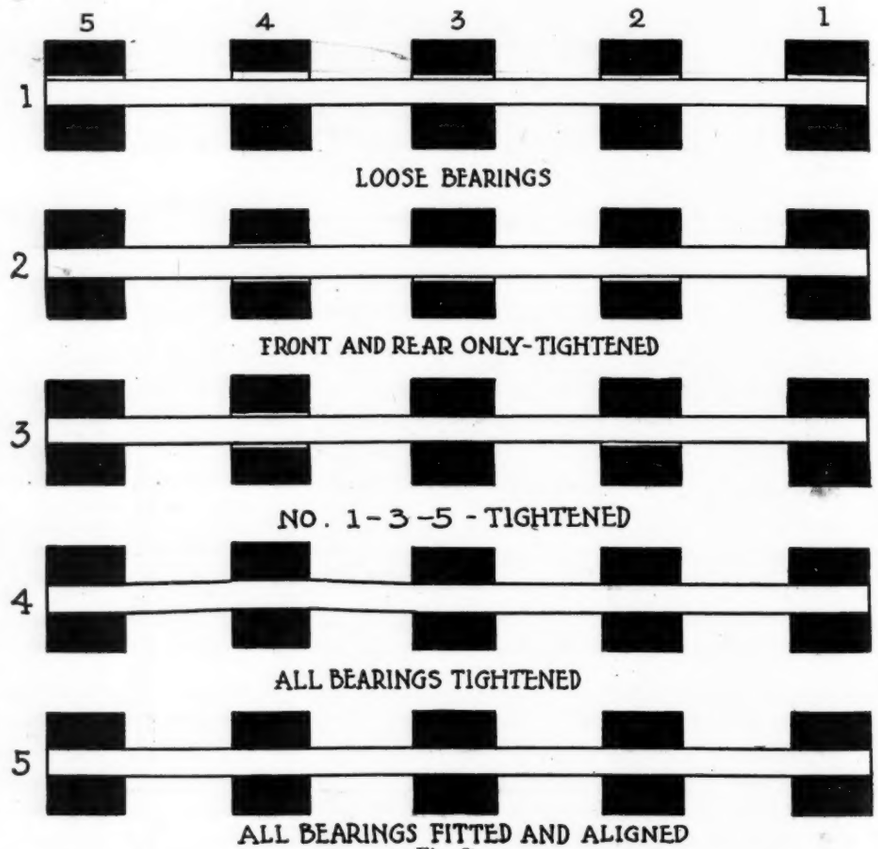


Fig. 7

The view at 4 shows how tightening the cap of a bearing that is misaligned will spring the crankshaft. To prevent any chance of damage to the crankshaft, the test as shown in Fig. 9 should be applied to the shaft before any of the caps are tightened. The center bearing on a three-bearing crankshaft is often pounded out because of initial misalignment of the upper half bushings.

A clearer picture of the necessity of alignment of the upper bushing half can be gotten if the reader will turn to Fig. 7. The layout is intended to represent a typical five bearing crankshaft, with No. 4 main upper half bushing out of alignment vertically. The second, third, fourth and fifth columns show the effects of adjustments when that condition exists, and attention is called to the effect produced in the fourth column.

(It is the impression among a few that the upper half crankshaft bearings are not called on to provide support to the crankshaft, to such a degree as the lower halves. Calibration of the amount of wear on the upper side of the connecting rod crankpin and the upper main bearing halves showed that in some cases the load on the upper bearings of both connecting rod and crankshaft was

in excess of the power impulse load on the lower halves. This condition was found mostly on high speed engines, where the inertia load on piston exceeds the gas load or power impulse load.)

Longitudinal Misalignment

Misalignment, at the time of overhauling, can also arise from bearings that have been so fitted that their center line

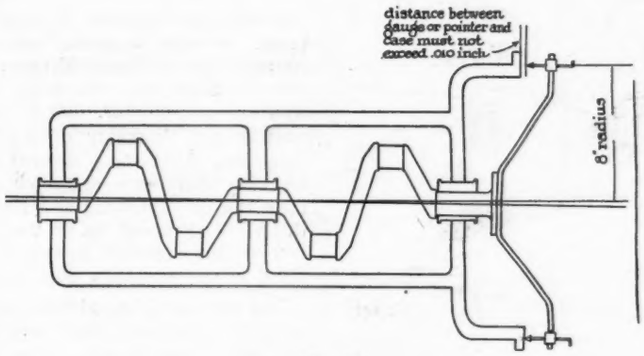


Fig. 8

The conditions as shown are greatly exaggerated in order to show graphically what is meant by Longitudinal misalignment. Improper mesh of front end gears and a noisy or binding clutch will result from a sets of bearings thus fitted.

is not longitudinally parallel to the center line of the crankcase drawn from front to rear of engine. Besides the effect on the bearings a crankshaft installed in this manner will oftentimes affect the working of the clutch. Especially is this true if the engine is part of a unit power plant, because the bell housing to which the clutch and transmission are fastened will be out of alignment with the engine flywheel. A simple test that can be applied without any unusual equipment consists in mounting a suitable pointer or dial indicator to an arm which in turn is fastened rigidly to the crankshaft flange.

A view of this test which is self explanatory can be seen by reference to Fig. 8. The limit of variation on an 8-in. radius should not exceed .012 in. If the dial indicator or a feeler gage, inserted between pointer and machined surface of the crankcase, indicates more than this amount, the crankshaft flange should be checked to see that it is square with the journals. In case the flange tests O. K., the trouble is due to misalignment of the bearing bushings which must be replaced and new ones fitted.

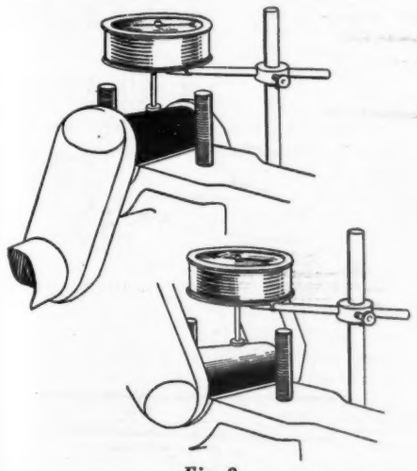


Fig. 9

This test is made in conjunction with the Prussian blue contact test and will determine the amount of deflection of the journal. If the shaft is straight and the upper bushing in contact with the journal, the blue will be evenly arranged in a thin layer on the journal after rotation of the shaft.

We have previously spoken of the conditions that would produce misalignment of the upper main bearing bushing. Another item that would produce the same effect would be the under oiling or lack of lubrication of any of the main bearings, which would cause that particular bearing to wear faster than the others. If the condition of misalignment developed after the car had been operated for some time, the first indication would be a bearing knock. In the attempt to remove the looseness or the knock by tightening the bearing cap the shaft is strained at least, or oftener, sprung.

Testing Shaft for Contact Without Removing Engine

When an engine knock has been traced to one main bearing that is loose, the cap on that bearing should not be tightened until determination has been made to see if the upper half bushing is in alignment. This can be done by cleaning the journal of all oil and dirt and applying a coat of lampblack or Prussian blue. Next revolve the shaft a few times with the cap removed and if the coating of blue is removed during the turning, it is proof that the upper half bearing is in contact with the shaft and the bearing may be adjusted by removing shims or filing the cap. If none of the blue is removed the shaft should be removed from the engine and the upper bushings aligned. It is necessary that the other bearings have no looseness during this test.

The test may show only a portion of the blue removed; if so, it is an indication of a journal that is either out of round or a crankshaft that is sprung. The extent of deflection of the journal may be measured with a dial gage which is clamped to any convenient fastening, the point resting on the center of the journal being tested. The difference between the maximum and minimum readings on the dial divided by two, will be the amount that the shaft is out at that point. A difference between maximum and minimum readings of more than .005 in., which mean that the shaft is out .0025, should be sufficient cause for the removal of the shaft.

The sketch in Fig. 9 will give some idea of how the test is made. It will be difficult to tell by this test, which has been made with the crankshaft still in the engine, whether the deflection is due to eccentricity of the journal or to a sprung shaft, so that in any event the safe procedure is to remove the shaft for further testing.

We might repeat here that the ultimate success of any bearing fitting job depends on the presence of two fundamentals, viz—**circularity** and **alignment**—and the circularity of the crankshaft pins and journals and their alignment with respect to each other is fully as important as the alignment of the upper case bushings. The only satisfactory way to determine the condition of the shaft is to test it separately.

Testing the Crankshaft Separately

The testing or checking of the crankshaft should be the first operation on all bearing work,whether it be adjusting the bearings, or fitting new bearings with the engine removed from the chassis.

Assuming that the shaft is now removed from the engine, the first check should be made on the main and connecting rod pins or journals for circularity. Condition of the shaft is determined by using micrometers, which should be applied at not less than three points along the length of the journal and at not less than six points on the diameter. The journal may be both eccentric and tapered, the maximum safe amount of eccentricity allowable is not more than .0025 in, Fig. 10. Each journal should be tested in this manner before testing the shaft for alignment, and if the eccentricity exceeds the limits mentioned the shaft should be sent to a regrinder.

Fig. 10

The micrometer is the only instrument that will accurately test connecting rod crankpin for circularity. The dial gage may be used satisfactorily on the main bearing journals journals.

If the journals are slightly roughened or scored, but not eccentric, it is possible to bring the shaft to a smooth finish by hand methods, but eccentricity should be removed by regrinding.

The next check is to find out if the shaft is in alignment, and we have purposely mentioned that this test should follow the **circularity** test, because it should be made with the end journals as the points of support, rather than the centers in the end of the shaft, and this necessitates that these journals be **circular** to secure a true reading. **The method of swinging the shaft between centers of a lathe is not dependable because many crankshafts are machined, using the end journals or flange for the datum point and not the center holes.** The end journals should be supported on vee blocks and the reading taken by means of the dial indicator as pictured in Fig. 11.

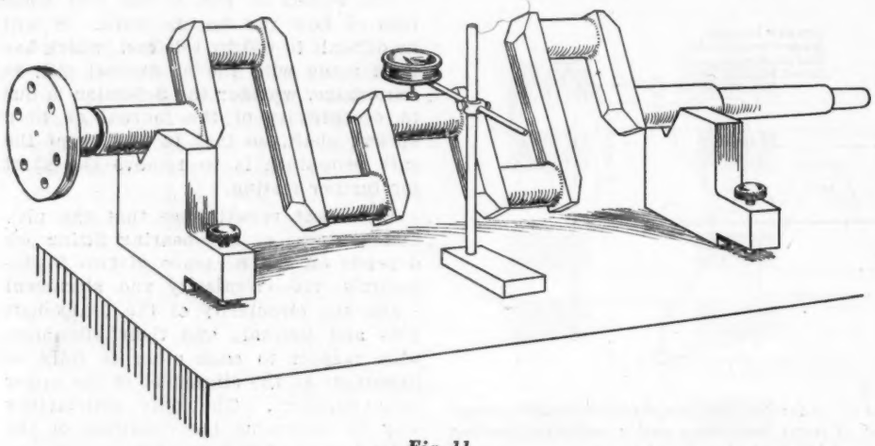


Fig. 11

The correct manner of testing a crankshaft for straightness. Swinging the crankshaft between centers on the lathe is not dependable because the shaft center holes are often eccentric with the end journals.

On shafts having an odd number of main bearings, as three, five or seven, the reading is taken from the center journal. If the shaft has four or six bearings, readings should be taken on both inner journals. If only two bearings, the readings may be taken by using two indicators mounted 180 degrees from each other, the readings being taken from both of the inner connecting rod journals.

A straightening attachment can be secured for most any standard make of arbor press, but, if it cannot be purchased, the service man may construct his own straightening attachment. All that is necessary is four or five good steel vee blocks and a rigid face plate. Two vee blocks should be slidably fitted to the base of the press, to hold the shaft during the straightening operation. A dial indicator type of surface gage is a necessary item of the straightening equipment. Considerable time may be required to get a good straightening job on the first few shafts, after which the operator will acquire skill enough to do the job in half the time originally required.

The Effects of End Play

Elusive engine knocks are often traced to the end play in the crankshaft, which is often produced by riding the clutch pedal or to natural wear. The end play may be great enough to cause sufficient movement of the shaft to allow the connecting rods to bind. The result will not only be a distinct knock or clatter, but possibly binding or cocking of the piston, with the attendant wear on the cylinder wall and tendency to overoil. A knock due to end play can be detected by pushing the crankshaft forward or backward while the engine is running, the noise diminishing or stopping when the point midway between the limit of end travel is reached. The replacement of the bushing designed to take the end thrust is the only practical remedy for the removal of excessive end play in the crankshaft. Checking the shaft for end play is shown in Fig. 12.

The increasing popularity of the hollow crankshaft method of main bearing and connecting rod bearing lubrication offers some advantages from the standpoint of maintenance. The connecting rod bearings that are thus oiled can be fitted in much less time than is required to fit the same size bearing of a splash lubricated engine. Again the element of **circularity** in fitting the connecting rod bearings must be present before a job can be done in an efficient and satisfactory manner.

Replacing a burned out or pounded out connecting rod bearing is a more or less difficult task if done with the shaft installed in the engine. The old, and still widely used, method is to remove the lower pan and take out the rod assembly. With the rod out, the new bushings are installed. (If die cast, the rod is replaced with a rebabbitted one.) The fitter must crawl under the car and start the fitting operation. If the bushings are much undersize the rod may be put on and taken off as many as 30 times before the bearing has been brought to size and surface. Besides the unfavorable conditions under which the operator must work, there is also the time element. The task can be considerably simplified, and the time required can be easily cut in half, if the mandrel method of fitting is used.

Saving Time by Using the Mandrel Method of Fitting

Briefly the mandrel method is as follows: Assume that the connecting rod journal or crankpin is **circular,** the diameter is then determined by calibrating with the micrometer. Let us take a shaft with a pin diameter of 2¼ in. or, in decimals, 2.250 in. Secure a smooth **circular** shaft of a diameter .002 larger than the pin diameter and clamp this in the vise. Proceed to fit the connecting rod to this mandrel just as it would be fitted in the crankpin, Fig. 13.

The rod should be given a snug fit, that is, a fit sufficiently tight that it will not fall of its own weight. The amount of tension or tightness when thus fitted should be equal to the effort required to move a well fitted piston pin. The spotting with Prussian blue can be carried out just as if the rod were being fitted to the crankpin. The mandrel being .002 oversize or larger than the crankpin will take care of the diametral clearance required for an oil film and expansion due to heat. When the rod has been fitted to the mandrel it may be assembled to the crankshaft and the job is finished.

The same method can be profitably employed on an overhauling job where the crankshaft has been removed from the case. Besides saving time and exertion, the mandrel method insures that the correct diametral clearance is maintained. The objection may be raised that the cost of securing mandrels that would accommodate more than one diameter of crankshaft would be prohibitive. The

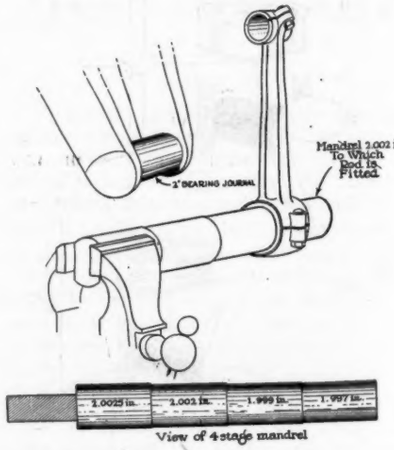


Fig. 13

It is not necessary to fit the bearing to the shaft journal if a mandrel of the necessary diameter is available. A mandrel of the required oversize eliminates the necessity of using a thickness gage or strip of shim stock to gage the diametral clearance

crankpin diameters of 28 different automotive engine manufacturers are divided among 8 different dimensions from 1½ in. to 3¾ in. Besides their utility as bearing mandrels, the same rods can be used for testing the straightness of the connecting rods.

The use of the mandrel is not confined to the fitting of pressure lubricated bearings and it may be utilized efficiently on connecting rod bearings which are splash lubricated. Generally speaking, the splash lubricated connecting rod bearing should have approximately half the diametral clearance of a pressure oiled bearing of the same size. The average machine shop can construct a mandrel having three or four oversizes of any standard diameter which will give the mandrel a wider range of usefulness.

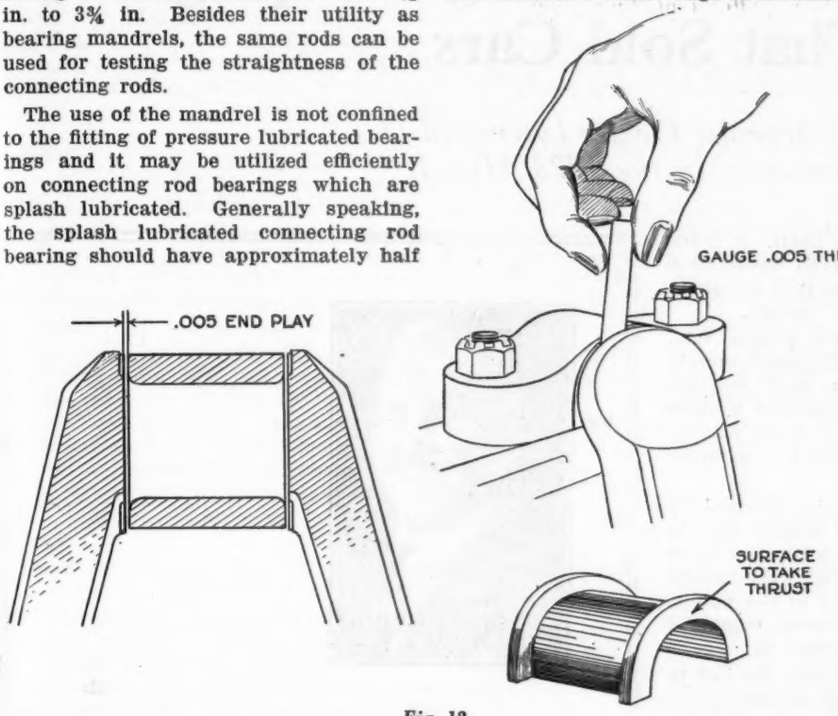


Fig. 12

Maintaining the proper amount of end play is a big factor in securing a quiet engine. Replacement of the worn bushing is the only satisfactory method for the removal of excessive end play. The amount recommended by the engine manufacturer varies with the size of bearings, but should not be less than .004 and not more than .010 on the average passenger car engine.

If the crankshaft diameter is 2 in., the mandrel should be turned with three steps or diameters as follows: 1.999 in., 2.001, 2.002 and 2.003, or if the length of the mandrel is too long with these steps the largest diameter may be omitted. The mandrel should be given a formation to the contrary, the burning in machine cannot do a good job unless the upper case bushings are firmly seated and **aligned.** Many crankshafts have been sprung as the result of expecting the machine to automatically secure smooth finish and may be hardened and ground if a high class job is desired. Two steps of undersize to accommodate for crankshafts that have been reground may be substituted for the second and third oversize.

All of the suggestions offered previously can be used in connection with the burning in machine with which many shops are equipped. Regardless of in-bearing alignment. The crankshaft should "bottom" on each of the upper bushings before clamping the shaft down.

The use of the line reamer is strongly advocated and although the first cost may seem an extravagant expenditure, the saving in time will pay for it in a comparatively short time. The burning in machine is at its best when used in connection with a line reamer and, where burning in is the factory process, it is preceded by line reaming. However, either process may be utilized to give a good job used independently of the other. In conclusion, let us repeat that if the **crankshaft journals are smooth and circular** and the **bushings fully bottomed and aligned,** the uncertainty of results and much of the drudgery incident to the operation will be removed.

23 Years Ago *This Week In* MOTOR AGE

(From MOTOR AGE of Nov. 7, 1899.)

Where Is It Now?

PROVIDENCE, R. I., Nov. 4—This week the first steam carriage manufactured by the Baldwin Automobile Co. of this city had a successful test on the road and its designer, F. N. Baldwin, states that it more than met his best expectations.

Carriage Builders Not So Foolish

The MOTOR AGE is in receipt of reliable information to the effect that the National Carriage Builders' Assn. convened in Indianapolis did not vote to exclude manufacturers of automobiles and automobile parts from membership, as stated from telegraphic reports in this and many other journals, but on the contrary voted to accept them on even terms with members of the older guild.

First A. C. A. Parade

NEW YORK, Nov. 5—Despite the discouragement of a bleak November afternoon, the initial parade and run of the Automobile Club of America was pulled off promptly as per program in every detail from the luncheon at the start to the bite by the way and the merry run home toward nightfall. Fully an hour ahead of starting time, set for 2 o'clock, automobiles of every variety, from the light speeding tricycle all through the line of victorias, phaetons, hansoms, runabouts and surreys, down even to a delivery wagon, began to gather around the Waldorf-Astoria in Astor Court and on Thirty-third street, while enthusiastic automobilers flocked into the small ball room near the main entrance, where they were received by the officers and a luncheon was served preliminary to the run.

When President Avery D. Andrews started the run at the head of the procession in his electric victoria with Jefferson Seligman as his guest there were some 40 vehicles in line, seating all probably not far from 120 people. In many of the carriages were ladies, who honored the occasion with as elaborate toilettes as they would present at a parade of the Coaching Club.

NEW YORK CITY, Nov. 1—An ordinance to admit automobiles to all parks in New York City has been introduced in the Municipal Council by Council Stewart M. Brice and was referred to the committee on parks.

Reflectors as Display Aids

How clevely reflected light can be used to bring out the attractions of a motor car and how the advertising value of its display can be enchanced thereby, is being demonstrated by the Snow Automobile Co., Ottumwa, Ia.

The company used but one car for the purpose and stationed it in the center of the sales room display space some 20 feet back from the window. Focused upon the car are a half dozen or so reflectors located among the upper part of the show-window where they are entirely outside the view of the gazer-in. The result is that at night the car is brilliantly illuminated and stands out in startling relief amist its dimmer surroundings.

The arrangement is singularly effective and compels the attention of passers-by. In the companion window is an attractive display of accessories, only here similarly located reflectors throw light directly downward. These two exhibits are the most brilliant and attractive inducements for attention along a business stretch of several blocks. This makes a very effective and economical way to advertise.

A "Mystery" Advertising Campaign That Sold Cars

How a Chevrolet Dealer Interested His Community in the 1923 Models

"MYSTERY" advertising is in a class by itself. It is the kind that runs along for days, maybe weeks at a time without even a hint as to what it is all about until the climax is reached and the "surprise" sprung.

Perhaps, as in the case of the Props-Dunn Co., Muncie, Ind., the series of ads leading up to the climax, will consist merely of a little more than a line. "It'll tickle you, too," was the idea carried through the series. Each ad concerned a story that "the boss" had told to his employes, a story which pleased them immensely, each ad gave a brief statement from some employe and the picture of the man.

Reproduced on this page is one of the series, devised by Ed. G. Brouilette, advertising manager of the Muncie Star in which paper the ads appeared. "Even if the rain pours down in torrents, there'll be plenty of sunshine in Delaware County tomorrow when the boss re-tells his big story to the public. Take my word for it—don't miss it," is the message contained with the picture of one of the company's salesmen.

Then the line, "It'll tickle you, too," which was the key to the whole series. Similar ads were run with nothing more than a statement from one of the employes regarding the "story" and the way it would tickle the people when they heard it.

"Don't tell the boss I said so but he told me yesterday that he was going to repeat his story right out loud. I want you to watch for it, it's worth while," is another message run on another day.

After a different ad had been run every day for more than a week, a two-page spread was printed and the "story" was told. It concerned the 1923 Chevrolet, which car the company handles.

According to the newspaper, the campaign went over big and created no end of interest. It sold cars, too, which was the main object.

This thing of mystery advertising has but one reason and that is to stimulate a large amount of interest before the final notice appears. It should, if possible get people talking and discussing it. Recently a Chicago newspaper started a similar campaign, preparatory to announcing a new edition which was to be published for baseball fans.

Two words were all that was used but little by little the whole story made its appearance. Needless to say, when this campaign was finished, it was clearly impressed upon the minds of readers, that if they wanted to get the complete baseball scores all they had to say to the newsdealer, was "the Peach" which was the name of the edition.

A theatre in the west, some weeks before opening, prepared a similar campaign. The name of the theatre was the Oldham, the date it would open May 25, and the show which would be the attraction the first week was a popular movie.

On the first night of the campaign, the letter "O" was shown being "carried in" by a liveried colored boy, the next day, the letter "L" was "carried in" and placed alongside the O and then the letter, "D" and so on until the complete name of the theater appeared.

The date of opening was announced in a similar way and with each letter added to the copy, the space was enlarged until, when the full ad appeared a week before the opening, the message, "Oldham Theater opens May 25 with Wallace Reid in 'The Love Special,'" stretched out across the top of the page in "ribbon" form.

This form of advertising, while expensive, is a novelty which has seldom failed to catch the ever curious eye of the public. The one thing to bear in mind in conducting such a campaign is to have a real smashing message at the end, so that the reader will feel justified in having read the announcements leading up to it.

"Even if the rain pours down in torrents there'll be plenty of sunshine in Delaware County tomorrow when the boss re-tells his big story to the public. Take my word for it—**don't miss it.**"

"It'll Tickle You Too"

Props-Dunn Motor Co.
114 E. Gilbert St.

Another form of "mystery" advertising was recently tried by a St. Paul dry goods merchant when he placed a background of black velvet in his window and a white card with the words "Watch this window" printed in black type on it. At night a single light played on the sign while the rest of the window remained black.

After two or three days a black and white shaded lamp was placed near the card and then the card was replaced by a single bolt of white silk, draped around a black pedestal. Later a bolt of purple silk was added in another corner of the window and the white light again brought to concentrate on it at night. A third bolt of brilliant red followed and another lamp added instead of the white light.

There is a suggestion for an accessory window which could be inexpensively yet attractively designed and layed out by the most inexperienced layman.

Profits From the Electrical Shop

The Way You Treat Your Customers Will Make or Break Your Business

By A. H. PACKER

DR. FORSYTHE cursed under his breath, silently but fluently, his starter had given one gasp that morning and then refused to work, and all of that cold winter day, it had been necessary to crank up in order to make the rounds from house to house, from this end of the town to that.

Two years ago the same thing had happened, and the good man could still remember the shop where the car was taken, and the man who did the work. Yes, his recollection of the man was all too vivid, a little man, keen for the work in hand, but possessed of a sharp tongue and a flaming temper, and so the doctor cursed, for on that day two years ago, he had vowed a mighty vow, that he would never enter that shop again, if he had to drive to Halifax for the next repair work needed.

Casual observation only is required, to see that the man who is "making money hand over fist," in the electrical business is rarely an electrical expert, but is rather an expert in business methods, while on the other hand the electrical expert trying to build up his own business is often blind to the mighty effect of business requirements, the greatest of which is the faculty of properly handling customers.

Are You a Good Fellow?

To this question we all would like to answer yes, but let us analyze ourselves on this basis. Out of a hundred grouchy customers that come to the shop, how many go away still grouchy? How many are pacified but far from pleased and how many leave with a smile? On this basis you can rate yourself as a good fellow. Deep in our hearts we know whether we have the faculty of meeting and pleasing men.

If the proprietor has this faculty, he should be on the job every possible minute making it pay dividends. Such a man, however, is likely to make the mistake of bothering about the details of the work in the shop to such an extent, that customers are allowed to stroll in, and often out, without a word of greeting. Such a man is picking up nickels while the dollars roll past.

Should the shop manager honestly analyze himself as a poor mixer, easily angered by the continuous complaints that stream into a service station, then he should without doubt, keep his eyes open for a man for this very important job of greeting the customer. Here electrical knowledge, while of course required, is a secondary consideration. Pick for example a fat, jolly, red-headed Irishman, not the kind that wants to fight on the least provocation. Take off his overalls, and throw them away. Put a white collar on him and let him do the job.

With his ready wit and quick comebacks, he will bring a smile from the darkest scowl, and will bring business to your doors. Some electrical knowledge he must have of course, but it need not be very deep, and if in a week, you can not teach him enough simple tests to get by with the job, then he should have a better teacher, remembering of course that in the event of some unusual case he can always call on you or the shop foreman for technical advice.

Diagnosing the Job

Next to a pleasant greeting, comes the importance of taking the job in a business like manner. A job ticket should be made out with the customer's name, address and 'phone number, so that you can get in touch with the owner if conditions develop which were not anticipated. Then the work to be done should be stated, and a flat rate quoted for the job if possible, or at least an outside estimate made as to the greatest amount that the work will come to.

A careful study of the time required for removing, and repairing the various generators and starters should provide information for this purpose.

The value of such a system will be appreciated when the mental attitude of the customer is considered. If he knows about what the job will cost, he experiences a feeling either of relief or resignation, but if he has no idea whether the job will be two dollars or run up to fifty, he is on pins and needles all day long.

Not only an estimate of the cost is demanded by the car user of today, but to such an extent have motor cars become a necessity that he demands information as to when the job will be ready for him again. Here also an accurate knowledge of the time required for various jobs is necessary in order that a reliable promise may be made. At this point in the plan, the man meeting the customers should be informed as to the progress of the various jobs, so that he can know whether his promises are being kept, and if not can phone to the car owner in question, explain the situation, and save the customer an unnecessary trip.

The Waiting Room

While careful and systematic planning will eliminate most delays, some seem to be unavoidable, and where a customer is compelled to wait for his car, it should be possible for him to do so without a sense of discomfort, or of feeling that he is in the way. Regardless of the size of the service station, it is possible to provide a place of some sort. Large service stations provide easy chairs, tables with magazines, drinking water, and a well-heated room in which these comforts may be enjoyed. Even in the smallest place, it is possible to provide a chair and possibly a paper or magazine.

The Final Inspection

Time and again, a car will be sent in to have the starter repaired, and when the car is called for, the owner will say: "Hey, my tail light isn't working, you fellows must have put it on the bum." How much better the impression would be if the shop foreman had made a thorough inspection and a report had been made to the owner by phone, or when he called. Without doubt, the owner would approve of having a new bulb installed and, whether admitting it or not, would approve of the care and vigilance exercised in that shop. Lack of inspection on the other hand, gives rise to arguments and gives the impression that the shop operates in a slip shod way.

Leaving With a Smile

Next to the pleasant greeting when the customer first arrives is the importance of an expression of friendliness when the car goes out. Here a bill promptly made and accurately stated will facilitate the business portion of the contact with the customer. While the cashier is taking care of this part of the transaction, the floor man can be talking with the customer, giving him little pointers on the care of the system, which will result in longer periods of service and reduced upkeep cost.

Then as a final clincher that has been found unequalled, a follow-up letter sent a few days later will prove invaluable in assuring the car owner that the shop is really interested in supplying satisfaction, and that the job is not considered finished until this end is attained.

Steering, from the Maintenance Viewpoint

Each Standard Make Is Dealt With Separately Regarding Adjustments and Lubrication. The Principles of Operation and Equipment List of Each Maker

By PAUL DUMAS

DITWEILER WORM AND WHEEL TYPE

The Ditweiler gear is another of the well known worm and wheel types of steering mechanism. No illustrations of the gear are available but its construction follows closely the design of the other gears of the same type. This firm has just recently placed on the market a cam type gear which is described later in this article.

It is factory equipment on the following cars and trucks.

CARS—

Beggs
Crow-Elkhart
Gardner
Maibohm
Norwalk
Piedmont
Pilot
Premocar
Seneca
Vogue

TRUCKS—

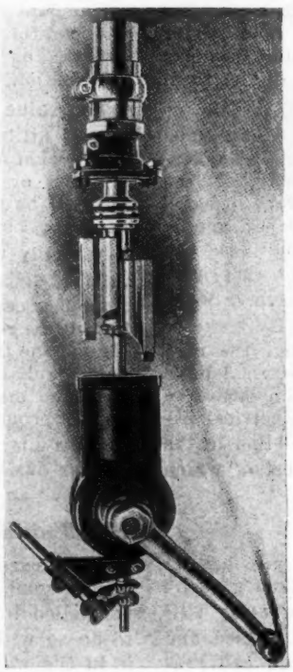
Dearborn
Models—E, F and 48
Norwalk
Model 35E.

An adjustment is provided to take up the wear by a thrust bushing which screws into the gear case directly above the worm, and provision is made in the construction for securely locking the adjustment. Turning the adjustment down or clockwise tightens the gear and vice versa.

The worm wheel shaft is provided with an adjustment for closer mesh of the worm and wheel to compensate for wear. The adjustment is effected by means of rotation of an eccentric bushing which also forms a bearing for the worm or steering shaft. All Ditweiler worm and wheel gears are equipped with a thrust screw adjustment for take up of end play in the worm wheel or steering ball crank shaft. This screw is equipped with a slotted head and lock nut for retaining the adjustment. New teeth on the worm wheel are brought into mesh by removing the steering ball arm and rotating the gear through 90 degrees. The ball arm is replaced and locked into position on the steering shaft (If the shaft is square it will necessitate filing a new notch for the ball arm locking bolt.)

Lubrication

Steering shaft and gear housing are equipped with grease plugs. A light grade of cup grease or non-fluid is recommended as a lubricant. A small quantity of steam engine oil should be injected into the housing at 3000 mile intervals to thin the grease.



The Jacox gear with upper housing cover removed to show the right and left handed half nuts which engage with the right and left hand thread on the column shaft. The steering can be changed from right to left hand by reversing the half nuts.

SCREW AND NUT TYPE GEARS THE JACOX

The Jacox gear is of the split nut and screw type and operates as follows: The lower and of the steering tube carries a double threaded worm or screw engaging with two half nuts which slide up and down in guides machined in the steering gear housing. The threads on the steering screw are right and left hand, and one of the nuts has a left hand thread, the other a right hand thread. When the steering wheel is turned, one of the half nuts rises in its guide while the other is forced downward. At their lower points the half nuts carry hardened steel thrust blocks which push against rollers attached to the steering yoke. The motion of the blocks tilts the yoke, which being forced against the steering ball arm moves it backward and forward. Through the medium of the drag link and the steering connecting rod the backward and forward motion of the steering arm is transmitted to the front wheels.

It is equipment on these cars:

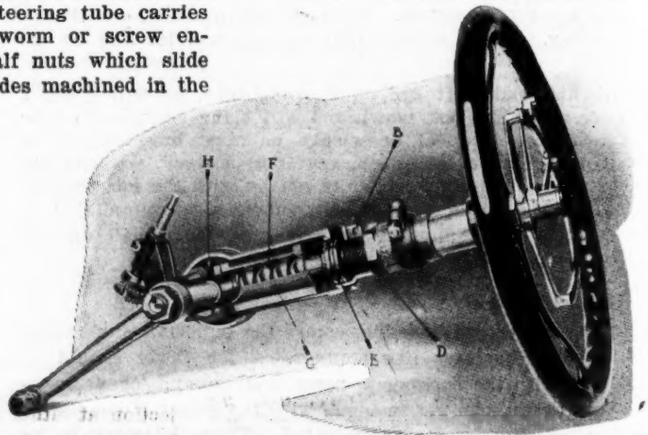
Ambassador	Oakland
Auburn	Oldsmobile
Case	Paige
Haynes	Paterson
Hupmobile	Ranger 4
King	R. & V. Knight
Kissel	Roamer

TRUCKS

Commerce, T, 12, 16, 18.
Dort, 103.
Fargo, R.
Huron, Erie and Mich model.
Kissel, Express model.
Republic, 75, 10, 10E, 11x, 19, 19W, 20.
Ruggles.
Samson, 15, 25.
Transport.
Speedboy, 20, 30, 50, 70.
United at Akron Multi truck 20.

Adjustments

A single adjustment is provided for the compensation due to wear. If excessive back-lash or lost motion develops it can be removed or taken up by loosening



The nut "D" has a right-hand thread, and movement clockwise causes the half nuts to make closer contact with the trunnion shaft rollers, thus providing a take-up for backlash.

the cap screw "B" and screwing down on the adjusting nut "D" (threaded with right hand thread.) Care should be exercised to see that the gear is not adjusted too tightly. All lost motion apparent on the hand wheel is not always due to the steering gear. The drag link and cross rod connections should be looked to for wear or friction. After the gear is adjusted lock the adjustment with the cap screw "B." The effect of the adjustment nut which bears directly on the thrust bearing "E" is to force down the screw "F" and the half nuts "G" against the rollers "H".

Lubrication

Gear is filled with a heavy graphite grease when it leaves the plant. However, this should be thinned occasionally by adding a little engine oil through the plug or cup in gear housing. The bearings for the yoke or cradle shaft are self lubricated by bronze graphite lined bushings.

The quickest and surest way to locate trouble is to jack up the front wheels, disconnect the drag link from steering arm and try the gear disconnected. Examine drag link connections and wheel spindles.

When assembling the working parts of gear, should it be dismantled, great care should be exercised to see that the half-nuts are properly installed. A good rule to remember in this regard when working on the split nut type of gear is that for

Left hand steering the left hand nut should be installed on top.

Right hand steering the right hand nut should be installed on top.

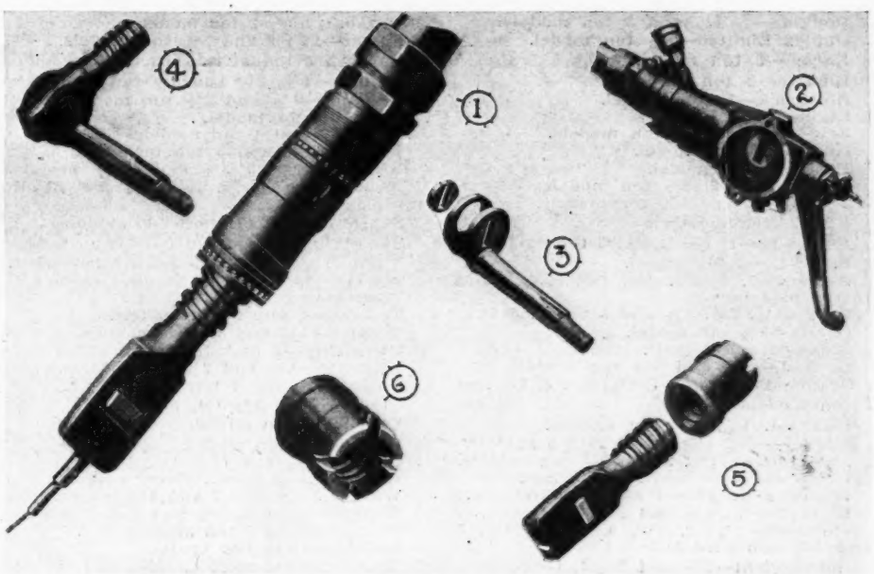


Fig. 9

Exploded view of the Ross gear. The nut 6 is attached to the steering tube by a four-jaw clutch construction. Rotation of the nut causes the screw 5 to travel up and down in the
Exploded view of the Ross gear. The nut 6 is attached to the steering tube by a four-jaw

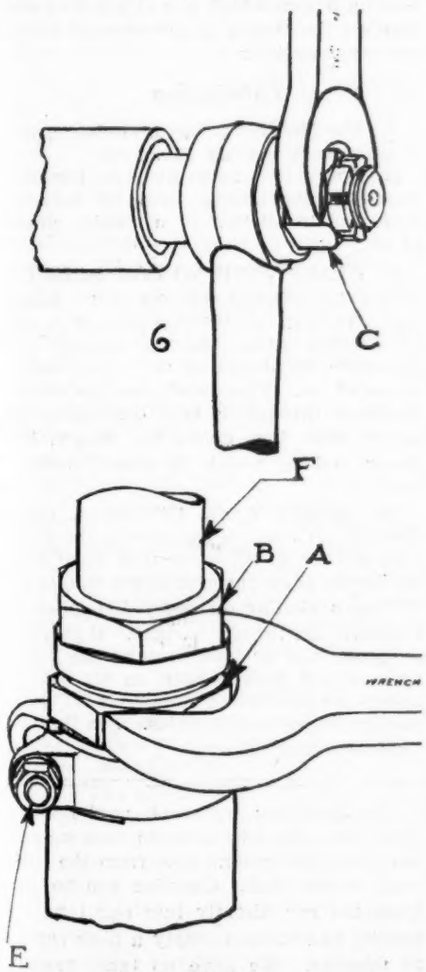


Fig. 10

Above: The steering arm will require frequent inspection during the first few months of service. It should always be drawn up tightly against the taper.

Below: The large nut "D" controls the movement of the thrust bearing and provides a means for the removal of up and down play and backlash.

SCREW AND NUT GEARS THE ROSS

The Ross steering gear is classified as a nut and screw type, but it differs from the Jacox in that it is of solid instead of the split nut construction. Only detail, changes are incorporated in the many models manufactured by the Ross Co., so that the model illustrated in Fig. 9 will serve for a reference on all maintenance operations. The model designations are "BA", "BF", "BB", which are cross type steering gears, and models "BU", "BL", "BM", "XK", "XA", "XB", which are designed for longitudinal or fore and aft steering.

The principle of operation is as follows: The nut is attached to the steering tube by a four-jaw clutch connection and rotates with the steering wheel. It is supported both below and above by ball thrust bearings (some models have only one set of thrust bearings.) As the nut rotates, the screw 5 travels up or down the nut, being prevented from rotating by suitable guides in the gear housing.

The lower end of screw carries a projection at either side to which are connoceted two swivels, "3." These swivels operate in cylindrical openings machined in the projecting arms of the trunnion or pitman shaft. As the screw moves up and down the swivels move with it and, turning, rotate the trunnion shaft. The steering arm is attached to the trunnion shaft by tapered splines. The following cars and trucks are equipped with this gear:

TRUCKS

Acason—1, 1½, 2, 3½, 5, 6 and 10 ton models.
Ace—1½ and 2½ ton models.
Acme—1, 1½, 2, 3½ and 5 ton models.
Ajax—1½ ton model.
American—3½ ton model.
American LaFrance—1½, 2, 2½ and 3½ ton models.
American Motorbus—3½ ton model.
Armleder—1, 2 and 3½ ton models.
Atco—1 and 2 ton models.
Atlantic—1, 2, 3½, 5 and 6½ ton models.
Atterbury—1½ ton model.
Austin—2 ton model.
Autocar—2, 3½ and 5 ton models
Auto Traction—2 ton model.
Available—2½, 3½ and 5 ton models.
Avery—1 ton model.
Baker—2 ton model.
Bartlett—7 ton model.
Bessemer—1½, 2½ and 4 ton models.
Bethlehem—¾ ton model.
Betz—2 ton model.
Big Four—3 ton model.
B. & R.—2½ ton model.
Bridgeport—1¾, 2 and 4 ton models.
Brinton—1½ and 2½ ton models.
Buffalo—1½ and 2¾ ton models.
Burford—1 and 2 ton models.
Capitol—1, ½ and 5 ton models.
Case—1½ ton model.
Clark Industrial Tractor.
Clydesdale—1, 1½, 2, 3½ and 5 ton models.
Collier—1, 1½, 2 and 3½ ton models.
Concord—1½ and 2½ ton models.
Corbitt—1, 1½, 2, 2½, 3½ and 5 ton models.
Cyclone—1 ton model.
Dart—1, 2 and 3½ ton models.
DeKalb—2 and 2½ ton models.
DeMartini—1, 2, 3 and 4 ton models.
Denby—1, 1½, 2, 3 and 5 ton models.
Dependable—1½ and 2½ ton models.
Diehl—1 ton model.
Dixon—2 ton model.
D-Olt—1½ and 2 ton models.
Dominion—2 ton model.
Dorris—2 and 3½ ton models.

Douglas—1, 1½ and 3 ton models.
Duplex Limited—1½ ton model.
Ehrich—2 ton model.
Elburto—2 ton model.
Electruck—¾ ton model.
Elgin—2 ton model.
Erie—1½ and 2½ ton models.
Eugol—¾ ton model.
Facto—2 ton model.
Fageol—1½, 2, 3½ ton models.
Famous—1 and 1½ ton models.
Fifth Avenue Coach.
Forschler—1, 1½, 2 and 3 ton models.
F. W. D.—3 ton model.
Garford—1, 1½, 2, 3½, 4½, 5, 6, 7 and 10 ton models.
Gary—1½, 2½, 3½ and 5 ton models.
Gersix—2½ ton model.
Giant—2 and 3½ ton models.
G. & J.—2½ and 3½ ton models.
Gramm-Bernstein—1, 1½, 2, 2½, 3½ and 5 ton models.
Hahn—1, 1¼, 2½ ton models.
Harvey—2½, 3½, 5 and 10 ton models.
Hawkeye—1, 1½, 2 and 3½ ton models.
Hendrickson—2 and 3½ ton models.
Highway-Knight—4 and 5 ton models.
H. R. L.—¾, 1½ and 2 ton models.
Hurlburt—1½, 2, 2½, 3, 3½, 4, 4½, 5 and 5½ ton models.
Independent—1½ and 2½ ton models.
International—¾, 1, 1½ and 2 ton models.
Italia—2 ton model.
Jackson—3½ ton model.
Kalamazoo—1½, 2½ and 3½ ton models.
Kankakee—1½ and 2 ton models.
Karavan—2½ ton model.
Kaws—2½ ton model.
Keystone—2 ton model.
Kimball—2, 4 and 5 ton models.
Kissel—2, 3½ and 5 ton models.
Kleiber—1, 1½, 2, 2½, 3½ and 5 ton models.
Klemm—2, 5 and 8 ton models.
Knox—6 ton model.
Lange—2½ ton model.
Lansden—¾ and 2 ton models.
Larrabee—1, 2½, 3½ and 5 ton models.
Lease—1½ ton model.
Maccar—1½, 2½, 3½ and 5 ton models.
Maxim—2½ ton model.
Mapleleaf—2, 3, 4 and 5 ton models.
Menominee—1, 1½, 2, 3½ and 5 ton models.
M. H. C.—1 ton model.
Moline—1 ton model.
Moreland—1½, 2½, 4 and 5 ton models.
National—1, 2, 3½ and 5 ton models.
Netco—2 ton models.
Northway—2 and 3½ ton models.
Northwestern—1½ ton model.
Ogden—¾, 1, 3½ and 5 ton models.
Old Reliable—1½, 2½, 3½, 5 and 7 ton models.
Olympic—2 ton model.
Oneida—1, 1½, 2, 3½ and 5 ton models.
Orleans—1½ and 2½ ton models.
Oshkosh—2 ton model.
Packard—5 and 6 ton models.
Paige-Detroit—1½, 2 and 3½ ton models.
Panther—1½ ton model.
Parker—2, 3, 4 and 5 ton models.
Patriot—1½ and 2 ton models.
Penn—2 ton model.
Pierce-Arrow—2, 3½ and 5 ton models.
Pittsburgher—2 ton model.
Power—1½, 2 and 3½ ton models.
Power Ox Industrial Truck.
Rainier—1½, 2½ and 3½ ton models.
Reliance—1½ and 2½ ton models.
Riddle—2 ton model.
Riker—3 and 4 ton models.
Robinson—3 and 5 ton models.
Rowe—2, 2½, 3, 3½ and 5 ton models.
Sandow—1, 1½, 2, 2½, 3½ and 5 ton models.
Sanford—2½, 3½ and 5 ton models.
Tait—2½ and 3½ ton models.
Tiffin—1½, 2½, 3½, 5 and 6 ton models.
Tower—1½, 2½ and 3½ ton models.
Towmotor Industrial Truck.
Trabold—1 and 2 ton models.
Traylor—1½ and 2½ ton models.
Twin City—2 and 3½ ton models.
Ultimate—1½ and 2½ ton models.
Union—2½ and 4 ton models.
Ursus—1 and 1½ ton models.
Velie—1½ ton model.
Veteran—2 ton model.
Vulcan—2½ ton model.
Wachusett—1 and 2½ ton models.
Walker Johnson—2 and 3½ ton models.
Walker—½, 1, 2, 3½ and 5 ton models.
Walter—3 and 5 ton models.
Waltham—1½ ton model.
Ward LaFrance—2½, 3½ and 5 ton models.
White Hickory—1 and 1½ ton models.
Wichita—1, 1½, 2, 2½, 3½, 5 and 6 ton models.
Wilson—1, 1½, 2, 3½ and 5 ton models.
Winther—¾, 1, 1½, 2, 2½, 3½, 5 and 7 ton models.
Witt Will—1 and 2½ ton models.
Wolverine—3½ ton model.
Yale—1 ton model.
Yale & Towne—Model J Industrial Truck.
Young—2 and 3½ ton models.

Adjustment

There are two points of adjustment, although only one can really be classed as an adjustment.

1. TO TIGHTEN THE STEERING ARM. "D" (figure 10) draw out "c" as tightly as possible and put in a new cotter. It is very important that the arm be put on itghtly. If it shows signs of looseness, tighten AT ONCE as above because the bearing of the arm on the shaft will be ruined quickly if allowed to stay loose. This should be given special attention during the first few months of service and will require adjustment seldom thereafter.

2. TO REMOVE UP AND DOWN PLAY OF THE STEERING WHEEL, and also lost motion in gear figure "10," lower. The adjustment at "a" takes up the wear in the thrust bearings. The adjustment should be made by loosening the clamping belt "e" and screwing down the large nut "a" until the end play has been taken up. Do not screw the nut down any farther than necessary to remove end play, as this will make the gear harder to turn and may break the balls in the thrust bearings. After making the adjustment tighten the clamping bolt "e."

3. On type "XB" and the "XA" with 1¾-in. outer tube, the outer tube is clamped in the adjusting nut "A" by clamping nut "B". Both nuts have right hand threads.

Adjustment of "A" may be made without disturbing the outer tuber "f" by backing off "B." When "A" has been adjusted, tighten bolt "e" and then tighten nut "G." If "B" is turned with bollt "e" loose, the adjustment of "A" will be disturbed. Should the outer tube become loose tighten nut "B."

The cross type gears "BA," "BB," and "BF" bears and the models "BU," "BL" and "BM" and "XB" fore and aft type gears do not have the three nut construction at the top of the steering housing. They are adjusted by simply losening the locking device which is a clamp bolt and turning the thrust nut downward as on the other models.

Lubrication

1. Use Mobile "C," or a similar grade of oil, but do not use cheap oil.

2. Every 1000 miles unscrew the pipe plug in gear housing and fill housing with Mobile oil "C," or a similar grade of oil.

3. GEARS WITH NO CONTROLS OR WITH EXTERNAL CONTROLS. Every 500 miles pull up oil plug located in top of steering wheel nut on column and fill tube with Mobile oil "C," or a similar grade of oil. This lubricates the thrust bearings through a hole drilled in the screw tube just above the screw, the lower end of which is closed with a cork.

3a. GEARS WITH INTERNAL CONTROLS. If there is an oiler in the outer tube nut, or in the outer tube itself near the thrust adjusting nut, inject Mobile oil "C" or a similar oil every 500 miles to lubricate the thrust bearings. If there is a spring clip or band around the outer tube turn it around until an oil hole is uncovered and inject Mobile oil "C" or a similar oil every 500 miles. See that oil holes are covered.

Developing the Filling Station

Probably the average small town automobile dealer regards his gasoline pump rather as a convenience for his customers than as a means for making a profit in his business. Yet here and there a dealer in some comparatively small town has so developed his filling possibilities that he makes good money.

A case in point is the Atlantic Automobile Co., Atlantic, Ia. The plant of this company is quite the automobile show place of the town, being a two-story, fire proof brick structure, 140 x 120 feet. An adjunct to the building is the oil and gasoline filling station.

E. E. Herring, manager of the company, says he has developed the business of his filling station to the point where its operation shows a net profit of from $1500 to $1800 a month.

"That's very much worth while," says Herring, "and that profit comes in mighty handy in helping to take care of the overhead on this plant, especially during seasons of slack car sales. Ours is not the only filling station in town, but perhaps we have some advantages in convenience of location, and then we keep the contingent expense of operation down.

"For instance; we are located not far from the railroad tracks so that we can have an underground pipe from the railroad to our tank. Gasoline can be run from the car directly into our tank by gravity and we can empty a tank car in 20 minutes. We have no tank wagons or anything like that hence we never have to handle our gasoline. This is so handy, and eliminates so much of the trouble and overhead incident to the ordinary filling station, that I never would install a filling station in any other way. We think the profit we show is going some for a town of less than 6000 inhabitants."

An "Anticipationist" Sells Accessories

"YOU can get that over to John Mahoney's."

I that statement has been made once it has been made thousands of times in the salesrooms of Boston motor car dealers. When buyers want some particular thing that does not come as equipment, and is not carried by the dealer, naturally the question of where to get it looms big.

And because the dealers learned long ago that about everything worth while was carried by John & Arthur—the firm name—and that the place was kept particularly clean and attractive, they, and their salesmen, had no hesitancy in sending customers there.

John J. Mahoney, a dozen years ago, was just breaking into the accessory business. Motor mechanic and driver, he saw possibilities ahead and took a chance. Since then his business has constantly grown from a small store on Boylston street, in a basement of a few hundred square feet, just about breaking even, doing a business of a few thousand a year. Now he has a large building of his own—no better anywhere in New England—on Massachusetts avenue, where his turnover is about $500,000 annually, drives a car of his own, and lives in a home of his own.

This business has been built up by looking ahead. John coined a phrase when telling the secret of why he is a success, that might be framed and hung over the desks of many accessory executives.

"I'm an anticipationist," he said with a laugh. "Anticipate what's coming and you can be up with the chief marshal's staff in the parade instead of with the rank and file worrying about keeping in step."

Some time ago, Mahoney, who keeps a close watch on matters legislative, saw where a new mirror law was being passed. He got in touch with the State House, learned when the law would be in effect, and secured a copy of it. In the Sunday papers, in his advertisement, he printed the facts about the law, and announced that any motorist in doubt about its interpretation might call or telephone and get his advice gratis. He had put in a supply of mirrors in anticipation of the law being passed, of which he had assurances from friends at the State House.

In the usual news columns of the papers there were stories about a new mirror law for motorists. But all the papers did not go into particulars. Reading the John & Arthur advertisement solved the problem for many dealers who were being called up. They got the right slant.

The law did not include all the motor vehicles, as it was designed more for trucks and closed cars. But many motorists visited John & Arthur, learned about the law, and why it was necessary, and then decided if it were good enough for trucks and public safety, it was good enough for them. They bought mirrors, although they were told it was not compulsory. And Mahoney made his cleanup on sales before many others realized the necessity of stocking up.

When Massachusetts began standardizing the light law, Mahoney kept in touch with the State House and got a line on what lenses would be O. K.'d, and he had them, and was able to advertise them intelligently when the regulation was passed.

He anticipated the demand for demountable rims some years ago, and bought the output of a factory. "His rim stock will break him," people remarked when they heard how many thousands he stocked up. Then he began advertising. They melted away as the demand grew. Other dealers seeking rims were unable to get them and he made a cleanup.

Because his store is arranged in an orderly manner, allowing self-service where a purchaser can pick out what he wants because it is among things akin to its line, people like to go there. They save a lot of time.

The name was picked out because John Mahoney and Arthur Watkins started business together and they were known by their first names. Customers had the habit of asking "Where's John?" "Is Arthur in?" and the name just grew. Watkins sold out his interest some years ago.

The "John & Arthur" salesroom is a model of order and was perhaps the first dealer chosen to stock genuine Fords parts.

MOTOR AGE'S PICTURE PAGES

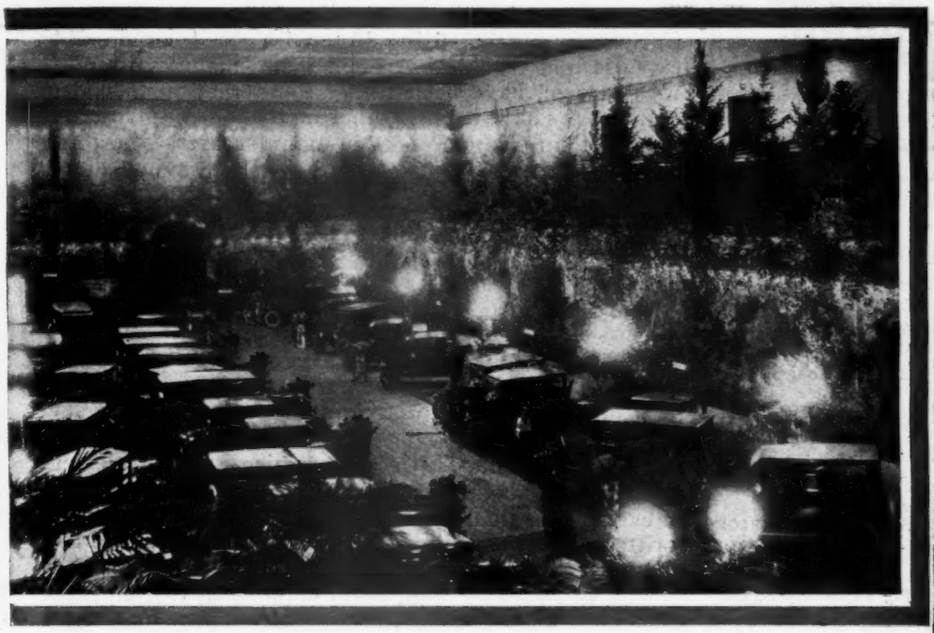
In Cheltanham, England, the traffic policemen wear long white coats, to catch the eye of the automobile drivers.

ST. PAUL, Oct. 26—The All St. Paul Closed Car Show under auspices of the Automobile Dealers' Association was held Oct. 11-14 in the Auditorium. The 70 exhibits were placed on the back stage of the building and the theater seats, facing the show room, permitted patrons to view the show and enjoy varied vaudeville entertainment from that point of vantage. The seats are in the extreme front of the picture shown here. Decorations were

Formerly one of the most dangerous spots on the highways of Connecticut, the underpass, shown at the right, was made entirely safe by the construction of a circular drive approach, which gives motorists a clear view of the road ahead. The old approach was a sharp turn and the more morbid residents of the neighborhood used to sit on the embankment and wait to see the cars smash

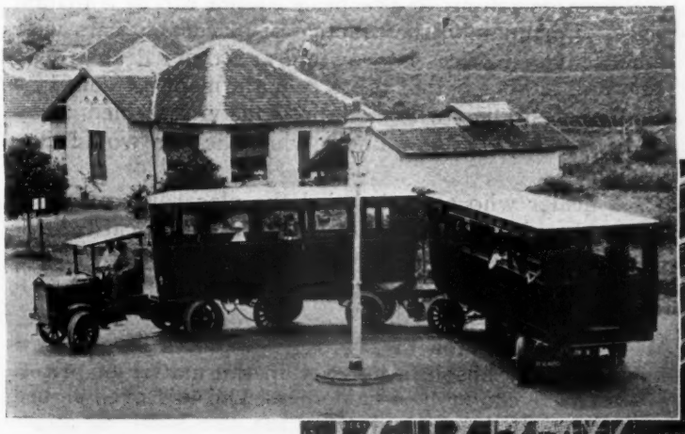
At the left: A section of the automobile park at the Yale Bowl, New Haven, Conn., during the Yale-Iowa football game. Fifty thousand people attended the game, and it looks as if they all came in their cars

OF AUTOMOTIVE INTEREST

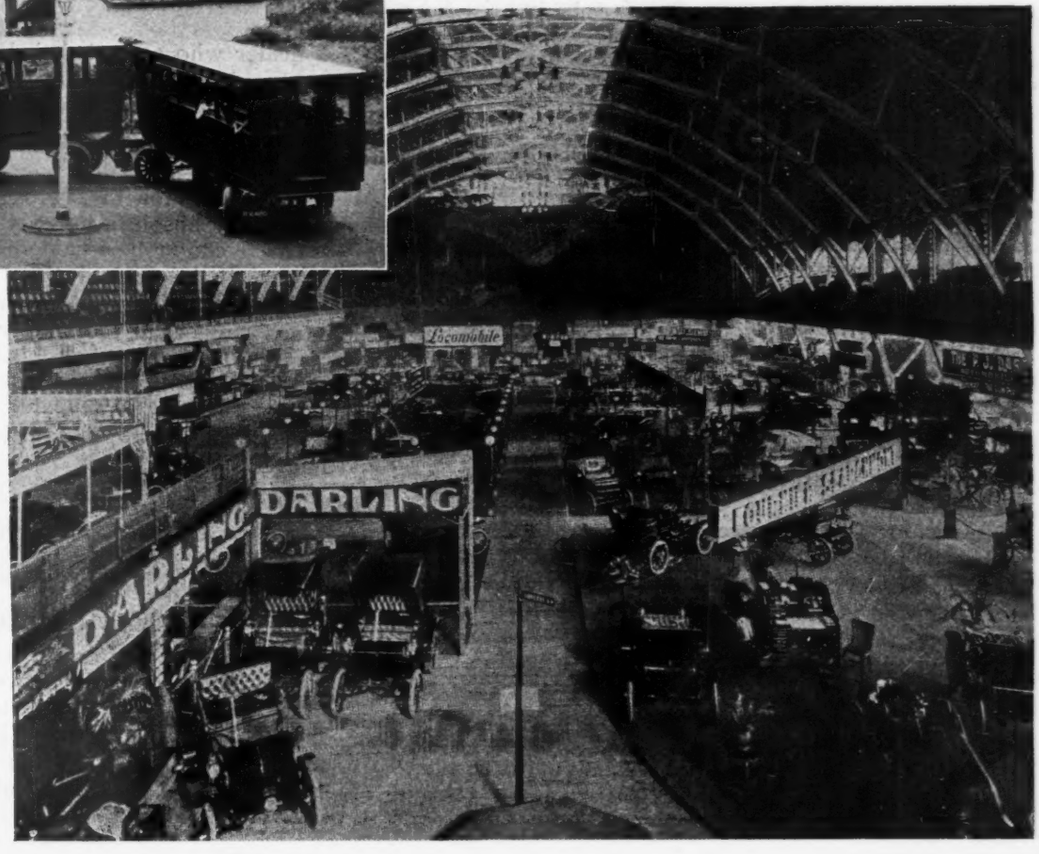


balsam and chrysanthemums. The attendance was ten thousand. An admission charg of 50 cents was made and 25 cents for women attending the matinees. Dan E. Weigle, who last year organized allied automotive lines into one association, managed the show, and the arrangements were in charge of Secretary O. A. Jaedecke.

Henry Ford and Admiral Moffett, Chief of the Naval Air Service, inspecting one of the racing airplanes at the Detroit Aerial Carnival



Both passenger trains, like the one at the left, and 20 ton freight trains, are used on the Island of Java, in the East Indies. The trailers and devices for making sharp right angle turns were supplied by an American firm, the Martin Rocking Fifth Wheel Co.



Over 20 years ago, in March, 1902, Chicago held its second automobile show, which was the first real, pay-your-way-in show in this country. It was described by MOTOR AGE, of that time, as one of "beauty and grandeur." Just compare it with the present day show pictured at the top of this page

MOTOR AGE

Reg. U. S. Pat. Off.
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Mistletoe

THE appeal of the Merchandising Department of the Automotive Equipment Association for Christmas merchandising was directed chiefly to the dealers. It was suggested that these dealers provide themselves with holiday boxes and wrapping paper and that they make the packages as suggestive of the holidays as possible.

This was an excellent trade building suggestion and has been accepted to a very large extent by the dealers of the country, as some jobbers already can testify, for they have on their books orders for merchandise that is especially intended for Christmas trade by the dealers. The dealers who are taking these steps are to be congratulated.

Now comes another factor in the Christmas trade, and he will be doubly welcome by all who regard this holiday movement as good business. This is the manufacturer who is packing some of his products in holiday boxes. The advertising pages of The Winter Service Issue, revealed a new idea along this line. One manufacturer is making a bright, holly covered jacket for his regular boxes, with labels and everything in regular business like style. This jacket goes over the regular box and if you should have a few of these boxes left over, you simply remove the Christmas jackets and have nice, clean boxes for regular stock.

This manufacturer appears to have gone a step or two farther with the idea than some others. He is making an earnest endeavor to help the dealers work out the Christmas merchandising idea with the least possible expense and trouble. A good many manufacturers, it would seem, have been rather indifferent to this idea, just as they have been to other merchandising ideas. It is more than trange to hear of manufacturers who think that the retail problems are entirely the province of the retailer.

"God helps them that help themselves."

"Graft" in Retail Prices

SEVERAL letters have reached MOTOR AGE commending an editorial printed on these pages several weeks ago under the heading "Savors of Graft" and dealing with the practice of some dealers in charging "loading expenses" to boost the retail price of cars higher than the factory prices. Those who have written about this editorial are outspoken in calling this charge "graft." So far no one has defended the practice.

Also word comes from some points that certain manufacturers have forbidden their dealers to include such items in the bills rendered to customers, but still other factories make a charge against the dealer for "decking" and similar items.

This feature of selling an automobile is very closely linked with the practice of many dealers who display only cards telling of the price of the car in a distant city. Fortunately, the practice of placarding cars with the delivered prices is growing, and those dealers who are doing this say that it has brought many persons into their salesrooms who had previously remained away because they did not know what the car would cost them.

A dealer who recently tried the placarding of a car, not only with the delivered price, but with a card showing exactly what a car would cost on the ten-month payment system, says that this was the best sales card he has ever displayed.

It is the opinion of MOTOR AGE that sales are best promoted by absolute honesty in the matter of prices. Stories are common of customers who had even signed on the dotted line and then left the store in anger because they found that the vehicle would cost them so much more than they expected. Few persons have any means of estimating what the freight should be on a car and most of them think they have been "gyped" when the increase is revealed to them.

A much better impression is gained by pricing the articles frankly.

"Creditors have better memories than debtors."

About Salesmen

THERE is an interesting story going the rounds in Chicago regarding two salesmen employed in an establishment where a low priced popular car is on sale. In this salesroom several men are retained to meet persons who come in and they are instructed to meet these prospects in regular order.

Recently two persons entered that salesroom at practically the same time and there was quite a difference in the appearance of the two supposed customers. The first to enter was rather roughly attired, was careless in his appearance and hesitated as he looked about. The second was smartly dressed, looked prosperous and walked forward with a quick step.

The salesman, first out, walked toward the door, looked the two prospects over and deliberately picked the second to enter as his victim. The second salesman could do nothing but take the other man, which he did —and be it said to his credit—with good grace.

The smart looking man's deal was soon complete. He had bought a three year old car and wanted an instruction book for it.

The second salesman's deal required a little longer, but within 30 minutes he had demonstrated a sedan, sold it to this man, who did not offer to trade in a used car, and had one-half of the total price as the first payment.

The lesson is so obvious that we hesitate to say more. The automotive distributors of today are looking over the salesmen as the dealers of the future. Many distributors are quite willing to help clean cut, energetic salesmen establish themselves as dealers in small cities and then to help them grow into dealerships in the larger towns. What chance has the salesman who was guilty of the bad ethics of the above instance to win such support?

It is such foolish things as the above that have put some salesmen at the automotive shows into disrepute. It was Burns who said a long time ago that the "coat does not make the man" but a good many salesmen have not heard of either Burns or of business ethics. Dealers might let them in on the news.

"All things are cheap to the saving, dear to the wasteful."

Tires

AS ONE evidence that the tire business is beginning to realize the importance of better relations between factory and dealer, we might mention here the factory mortality in the last year. A year ago there were 245 tire manufacturers seeking a profitable share of the business. There were a good many disappointments, as only 180 of these factories survive.

Just what was the cause of all these failures is not a part of the data at hand. But a review of the list recalls that a number of these failed concerns ignored the rules of good business, such as making worthy merchandise, treating their dealers equitably and making honest guarantees.

Some of the advertising put out by these failed manufacturers was of such a nature that worth-while buyers were instantly warned of some impending trick. A good deal of this kind of advertising has been employed by the tire industry. As a rule, the tires manufactured by these firms fell into the hands of merchants whose methods were in keeping with the advertising. Some of these merchants are still in business and are still able to buy tires of suspicious history and little quality to continue their careers. Rumors have it that frequently these strangely named tires come from some of the factories that have a reputation of making an excellent quality tire.

It will be a great day for the tire dealers of the country when it becomes known to all manufacturers that a tire to be properly merchandised must conform with the standards of that trade; that the dealers who handle it must be as worthy as the tire, so that a local reputation may be built to conform with the tire itself; that this dealer must be protected against cut price and other bargain sales, not only on this particular brand of tire but against brands made by the same factory but marketed under a pretense of being produced by a different firm.

There is a great future in automotive tires. The field is established and is growing. It is only necessary to get prudent management in existing plants to put this business on a high and profitable basis. Every dealer who stands true to decent business principles will help bring about that day.

"If you have time, don't wait for time."

Irresponsible Dealers

THE car distributor is coming in for considerable criticism in certain sections because it is alleged he is responsible for the intrusion of many more or less irresponsible dealers into the trade. The accusation runs that some of the distributors are so solicitous about getting their full quota of cars into their territory that they do not exercise sufficient care in investigating the character and abilities of some of the men whom they appoint as dealers.

The trouble seems to be that some of these new dealers never have had any previous experience in the automobile business and that, in the process of acquiring experience now, they are seriously demoralizing the trade for the older established dealers. These new dealers are accused of placing excessive valuations on trade-ins, for instance, and thereby introducing a competitive condition which the older dealers find it difficult or impossible to meet.

The older dealers admit that sharp competition is unavoidable and that they are willing and prepared to meet all kinds of it that are legitimate, but they say the irresponsible dealer, who many times is hardly more than a curb stone dealer with no business habitation, is introducing complications which hardly can be regarded as legitimate and which are having the result of demoralizing the business and making it hard for the dealer who has a place of business and a recognized overhead to meet.

Most of these complications appear to arise over trade-ins, as the owner of the old car shops around to find where he can get the most for his old machine. These new dealers fall easily and too often meet the owner's ideas of what he ought to have instead of appraising the old car at its real value.

It is scant consolation, of course, for the older dealers to know that this sort of thing will sooner or later force the new man out of business, because he will have lost all his money. They would be much better pleased if the new men should manifest more evidences of being real business men and of having some conception of the ethics of the business. The introduction of these new men is laid to the distributor, and many old time dealers say the distributor apparently either makes no investigation of the character and standing of his new appointees or else he doesn't care. In either event, the trade is carrying a lot of undesirables and just how to meet the situation is exercising the minds of many men who have been in the automobile business for many years.

October Production Reaches 244,000

200,000 Figure Exceeded for Seventh Time This Year

Total for 10 Months Is Near Record Output of 205,000,000 in 1920

NEW YORK, Nov. 4.—October has produced another surprise for the industry, for in that month production figures not only broke all previous records for the tenth month of the year but it added to the glory of 1922 by being the seventh consecutive month in which the 200,000 mark was exceeded. Counting October, nearly as many motor vehicles have been produced in the 10 months of this year as in the full 12 months of the banner year, which was 1920.

Report of N. A. C. C.

The report of the National Automobile Chamber of Commerce to its directors states that the approximate production for October was more than 244,000, or nearly 40,000 over September and bettering the previous best October—1920 with about 200,000. This report is based on shipping reports for the first three weeks of the month from N. A. C. C. members and for Ford for the full month, but it is thought that the total reached is fairly accurate, for production has been running along at an even pace for some time now.

The big increase over September is explained by Ford getting back into production. The four day lay-off of the Ford plants in September prevented that month from holding its place in line. Ford is not back to capacity production as yet, according to reports from Detroit, which place his daily average at the present time at about 4800 whereas his capacity is 5200. With Ford going at his limit, it is more than likely October would have run close to June, the peak month of the year with 289,011.

Traffic Managers Help

This enormous delivery of cars in October was not accomplished without great effort on the part of the various traffic managers, for it is very evident that the transportation situation is becoming grave indeed. It is extremely difficult to get freight cars and even when they are found the factories have to adopt many expedients to get their products into the carriers.

Driveaways are increasing, which is to be expected in view of the railroad situation, although Ford seems to be meeting with a good break in luck, for his car shipments have been improving while his driveaways have decreased within the past months. The approach of cold weather only adds to the embarrassment of the situation, for the industry has been helped mightily by boat shipments.

TRACTOR SCHOOLS IN 10 CITIES

LA PORTE, Ind., Nov. 6—The Advance-Rumely Co. will conduct its fifth annual tractor school this winter, with sessions in 10 cities beginning in December and closing in March. It is expected that about 2000 students, including many owners, will take advantage of these schools at which instruction will be given in the operation and servicing of the company's tractors and other power farming machines. Talks on power farming will be given by J. Leo Ahart of Dow City, Ia. About six carloads of machinery will be carried around to the various schools for demonstration work.

Following are the places and dates for the various sessions: Dallas, Tex., Dec. 18 to 22; Wichita, Kan., Jan. 2 to 6; Kansas City, Mo., Jan. 8 to 12; Omaha, Neb., Jan. 15 to 19; Des Moines Ia., Jan. 22 to 26; LaPorte, Ind., Jan. 29 to Feb. 2; and Feb. 5 to 9; Madison, Wis,, Feb. 12 to 16; Minneapolis, Minn., Feb. 19 to 23; Aberdeen, S. D., Feb. 25 to March 2; Fargo, N. D., March 5 to 9.

Governor Acts on Automobile Deaths

COLUMBUS, O., Nov. 4.—Attorney General Price will be asked to call a meeting of municipal law directors of the larger Ohio cities in order to draft a uniform traffic ordinance for these cities, it has developed as a result of Gov. Davis' presence in Cleveland Oct. 20, where the most serious traffic accidents of the year occurred. Two boys and a man were killed and 35 others were under medical care as a result of automobile accidents there. It was announced that the Governor will take up the question of providing a uniform regulation for the larger cities, with the attorney general in the hope that something may be done to decrease the death rate.

WASHINGTON ENCLOSED CAR SHOW

WASHINGTON, Nov. 4—A successful enclosed car exhibition ended here last week after being attended by 25,678 persons. No official figures are available as to the number of automobiles and accessories sold, but an individual poll of the 85 exhibitors places the figure at approximately $75,000. Fifty exhibitors of cars showed 62 different makes. Thirty-five accessory firms were present with their exhibits.

It was voted to hold the spring show on March 10-17.

HUNTINGTON DEALERS ORGANIZE

HUNTINGTON, W. Va., Nov. 6—Automobile dealers of Huntington, at an enthusiastic meeting in Hotel Frederick, formed a permanent organization and elected officers to serve for the next year. Approximately 70 per cent of the automobile companies in the city were represented.

Two Indicted for Fraudulent Use of Champion X Labels

Federal Grand Jury Finds Bill Against Men Who Marketed Article Called Counterfeit

CLEVELAND, Nov. 6—The Federal Grand Jury here has indicted David Goldston, alias David Goldstein, alias D. Charles, alias Charles David, and Tom O'Leary on charges of using the mails to defraud users of spark plugs, by placing Champion X labels on spurious spark plugs.

The indictments allege that the Champion Spark Plug Co., of Toledo, O., has been making spark plugs known as Champion X; that there are approximately 4,000,000 now in use; that the company has spent large sums of money in perfecting the plug; some of the parts and material used in the production of the genuine Champion X spark plug, the paper in which they are wrapped, and the cartons in which they are placed for use are made under a special process; that these and other features give the Champion Spark Plug distinction and superiority of construction causing the plug to be a standard of value for a spark plug of this type; that the company has spent large sums of money for advertising and bringing it to the attention of users of Ford automobiles; that the system of distribution is to sell the same to regularly appointed jobbers of automobile accessories, who supply the trade.

That the defendants having knowledge of the popularity and superiority of the Champion X spark plug, for Ford automobiles, manufactured in imitation of the genuine Champion X a spark plug which they falsely labeled Champion X and that the deception was carried into the paper wrappings for the spurious plugs.

The spurious plugs, the grand jurors say, were produced at the plant of the Cleveland National Machine Co. A didrect charge that spark plugs so manufactured and labeled as Champion X were spurious is made in the indictment.

There are six counts in the indictment, most of which set forth correspondence about the spurious spark plugs and the shipping by parcel post of the plugs.

PREST-O-LITE OFFICES MOVED

INDIANAPOLIS, Nov. 6—Prest-O-Lite Co., Inc., has moved its main offices from New York to Indianapolis, in order to bring sales, service and production closer together.

Factory Production Turning Largely to Enclosed Models

Body Shortage Interferes With Maintaining Output at Normal Capacity; Situation Improving

DETROIT, Nov. 4—Maintaining production marks at points approximating those of the earlier months of the year is largely a matter of material supply, enclosed bodies being the principal obstacle to continued heavy operations. Demand for open models is limited to special sections of the country and to export markets. Some factories report demand for enclosed bodies now to be in excess of 75 per cent of output.

Several factories which have been among the leaders during the year are now operating on low schedules because of failure of closed body supply. Orders on many of their closed models are piled two months ahead and the plants are operating at 30 to 50 per cent of former production figures. One of these factories with orders far ahead showed an operating deficit in the last two months.

Dealers Decline Open Cars

For the most part, dealers are declining to take open models for stocking against spring demand and are clamoring for all the enclosed models they can get. There is a general demand for enclosed cars from cities in every part of the country. Price uncertainty has caused dealers to fight shy of accepting any models except those for which they have a ready market. If there is to be any stocking it will be light and will not take place in any volume until the spring season is at hand.

A large part of the recent open body business is in special models with sport trimmings, the usual open types not making special appeal except in those cars which recently have been remodeled or repriced. New sport models will be brought out by a number of factories in the near future to meet the demand now existing for cars of this type.

Ford Motor Co. will continue to build at the rate of upwards of 5,000 cars daily, a rate maintained through October. Sales are running in excess of production and the company is extending its output as rapidly as it can. **Chevrolet** is now on a basis of about 1,200 daily and will increase this to 2,000 as rapidly as it can execute its new factory and production plans.

Buick is operating at close to 800 cars daily, this total including its Flint, Detroit, and the McLaughlin Buick plant in Canada. **Studebaker** continues at its maximum of about 450 daily in all plants. **Dodge** is operating at about 600 daily, its normal capacity, **Hudson-Essex** at about 250 daily, **Hupp** at about 125 daily, and **Paige-Jewett** at 125.

Maxwell has run into a shortage of closed bodies and production has been reduced considerably below earlier season figures, but will rebound as rapidly as the body plant can be brought up to high output. **Chalmers** operations continue at the former rate pending the completion of negotiations for the taking over of the company by Maxwell.

Cadillac continues to lead in the better priced car field, holding its schedule close to 100 cars daily. **Packard** production is continuing steadily at about 2,000 monthly. **Lincoln** is at capacity, but production facilities are low, and will continue so until the completion of plant extensions now under way. **Wills-Sainte Claire** is operating at approximately 20 cars daily.

Oakland and **Oldsmobile** sales are continuing high, production at the factory showing increases in October, with probable further increase in November. Both are operating in excess of 100 cars daily. **Reo** is building in excess of 100 daily, this total including cars and trucks. **Columbia** is building about 50 daily.

Dort is building about 100 cars daily. **Durant** is building 100 Durant fours daily at the Lansing plant, and is starting on a production of upwards of 100 daily on the **Star** car. **Gray** is now building about 100 cars daily and is making additions to its dealer organization steadily. **Earl Motors** is building about 1,000 a month. **Nash Motors** is producing at the rate of 192 sixes and fours a day.

Oregon Dealers Find Sales Slowing Up

PORTLAND, Ore., Nov. 6—Although automobile dealers of Portland and the Oregon district generally are facing the winter confident that business, particularly in the enclosed car lines, will be good throughout the cold season and that business in all lines will be much improved over a year ago, there has been a considerable slackening up of activity during the present month over September, according to a study of the situation and to reports of leading dealers.

This is particularly true of the higher and medium priced lines, although some of the smaller cars continue to go nearly as strong as ever.

Gordon Lee Tells Equipment Men About Foreign Trade

Explains How Commerce Body Is Making Survey of Foreign Fields

CHICAGO, Nov. 6—One of the largest meetings of the Association of Automotive Equipment Manufacturers was held Friday night to hear an address by Gordon Lee, chief of the automobile division of the Bureau of Foreign and Domestic Commerce of the United States Department of Commerce. About 80 members and guests were present. Lee described with considerable detail the efforts being made by his department to give American automotive manufacturers full information about foreign markets. An innovation which he described is the listing of foreign automotive dealers by countries, with as much detailed information about each one as is available. He also explained how the department is conducting a survey of the automotive market in foreign fields, the result of which will soon be available to American firms.

STUDEBAKER BIX 6 INCREASED

SOUTH BEND, Ind., Nov. 6—Studebaker Corp. has increased the list on its Big Six, the increases ranging from $50 to $135, according to body style. The list is as follows:

	Old Price	New Price
7 pass. Phaeton	$1,650	$1,785
4 pass. Sport Phaeton	1,785	1,835
4 pass. Coupe	2,275	2,400
5 pass.	.....	2,550
Sedan (regular)	2,475	2,475
Sedan (special)	2,650	2,750

A REAL CHRISTMAS GIFT

CHICAGO, Nov. 6—Thomas J. Hay, president of the Chicago Automobile Trade Assn., has issued a statement given considerable publicity in the daily press, calling attention to the suitability of the enclosed automobile as a Christmas gift and stating that the inquiries for cars for that purpose this year are more numerous than ever before.

October Production Compared With Other Months of Year

NEW YORK, Nov. 6—The following table shows how the October production of motor vehicles compares with the other months of the year in number of units, carload shipments, boat shipments and driveaways:

	Output		Carloads		Driveaways			Boat		
	1922	1920	1921	1922	1920	1921	1922	1920	1921	1922
January	91,109	20,057	6,485	15,357	29,283	3,185	7,479	.....	93	143
February	122,366	25,505	9,986	19,636	43,719	7,507	10,173	.....	99	180
March	172,720	29,236	16,287	27,753	57,273	9,939	16,917	.....	75	180
April	219,558	17,147	20,187	31,334	64,634	14,917	22,381	.....	1,619	2,960
May	256,219	21,977	18,608	33,416	74,286	15,193	28,827	.....	2,381	7,406
June	289,011	22,516	20,269	34,230	60,746	18,834	33,857	8,350	3,947	7,737
July	245,414	23,082	19,514	28,412	52,342	15,533	28,022	8,762	3,726	6,855
August	273,425	23,386	20,350	32,563	34,060	14,290	36,603	7,095	3,565	10,028
Sept.	205,405	20,804	20,150	25,950	24,431	13,550	30,055	5,469	3,580	8,002
October	244,000	17,209	17,323	26,980	14,127	11,257	33,320	2,519	2,300	7,040

Factory shipment for the other months of 1920 and 1921 follow:

	Carloads		Driveaways		Boat	
	1920	1921	1920	1921	1920	1921
November	13,253	14,061	9,497	10,509	659	1,385
December	11,802	12,100	6,469	7,500	89	134

Names of 53 New Members Recently Elected to N. A. D. A.

Latest List of Dealers Added in "One of a Thousand" Plan

ST. LOUIS, Nov. 6—The latest list of new members elected to National Automobile Dealers' Association under the "One of a Thousand" plan contains 53 names. They follow:

P. K. Webster Co., Inc., Oakland, Calif.
J. J. Jacobs Motor Co., Sacramento, Cal.
James-Nash Motors Co., Denver, Colo.
Arthur L. Clark Co., Inc., Bridgeport, Conn.
Reo Motor Car Co. of Chicago, Chicago, Ill.
Braley, Graham & Child, Inc., Portland, Ore.
Oldsmobile Co. of Oregon, Portland, Ore.
Talbot & Casey, Portland, Ore.
P. T. Donovan, Burlington, Vt.
Chas. R. Simpson, Bellingham, Wash.
Nugent Motors Co., Everett, Wash.
Central Agency, Seattle, Wash.
W. L. Eaton, Seattle, Wash.
Franklin Wicks Co., Seattle, Wash,
Great Western Motors, Inc., Seattle, Wash.
William L. Hughson Co., Seattle, Wash.
Nute Motor Company, Seattle, Wash.
Schott-Halsey Motor Co., Yakima, Wash.
East Side Buick Co., Milwaukee, Wis.
Edwards Motor Car Co,, Milwaukee, Wis.
Frint Motor Car Company, Milwaukee, Wis.
Koehler-Rahn Auto Co., Milwaukee, Wis.
W. H. Krueger Motor Co., Milwaukee, Wis.
Nash Sales Co., Milwaukee, Wis.
Bairs Garage, Eureka, Calif.
Chas. Green Co., Eureka, Calif.
Harvey M. Harper, Eureka, Calif.
A. E. Hermanson, Sales & Service, Eureka, Calif.
Lundblade & Jewett, Eureka, Calif.
Harry E. White, Inc., Glendale, Calif.
Walter M. Murphy Motors Co., Los Angeles, Calif.
Bell & Boyd, Cakland, Calif.
Edgar & Hays, Santa Ana, Calif.
Orange County Garage Co., Santa Ana, Calif.
Colorado Motor Sales Co., Denver, Colo.
The New England Motor Sales, Greenwich, Conn.
Charles Lange & Bros. Co., Chicago, Ill.
Guy C. Ferre, Decatur, Ill.
Repass Automobile Co., Waterloo, Iowa.
J. W. Robinson Co., Lawrence, Mass.
Nash Motor Sales Co., Kansas City, Mo.
Le Grande Garage, Sedalia, Mo.
Elizabeth Automobile Co., Elizabeth, N. J.
The Fuller Automobile Co., Cincinnati, Ohio.
The Johnstown Automobile Co., Johnstown, Pa.
Harper & Harper, Philadelphia, Pa.
Steel City Automobile Co., Pittsburgh, Pa.
Studebaker Sales Co. of Pittsburgh, Pittsburgh, Pa.
Amarillo Buick Cadillac Co., Amarillo, Texas.
Cullum Motor Co., Amarillo, Texas.
Browning Automobile Co., Salt Lake City, Utah.
Grady Motor Co., Salt Lake City, Utah.
Riegel Brothers, Spokane, Wash.

M. A. M. A. HAS 416 MEMBERS

NEW YORK, Nov. 4—The Motor and Accessory Manufacturers' Assn. has just established a new membership record. It now has enrolled 416 companies, a net gain of 25 in the last 12 months. This is the highest total reached in the 18 years' existence of the M. A. M. A. General Manager M. L. Heminway has his heart set on bringing the number up to 500 by the end of 1923

10,168 Die in Automobile Accidents, Report of 1921

WASHINGTON, Nov. 3—Statistics compiled by the Bureau of the Census show that in 1921, 10,168 deaths resulted from accidents caused by automobiles and other motor vehicles, excluding motorcycles. This number represents a death rate of 11.5 per 100,000 population as against 10.4 in 1920 and 9.4 in 1919 and 9.3 in 1918.

The state of New York had 1,633 casualties, or 15.4 per 100,000 population in 1921, as against 13.5 in 1920. Pennsylvania was next with 1086 casualties, or 12.2 for each 100,000 population, as compared against 11.9 in 1920.

According to the Bureau of Census there were 886 deaths resulting from automobile accidents in Illinois; 865 in California; 737 in Ohio; 519 in Massachusetts; and 443 in Michigan. The other states had fewer casualties. In Detroit there were 133 deaths from automobile accidents.

EASTMAN HEADS DEALERS

NEW YORK, Nov. 6—Lee J. Eastman, president of the Packard Motor Car Co. of New York, is the new head of the Automobile Merchants' Association of New York, having been elected to that office at a special meeting of the directors. The new vice president is Russell I. Engs, president of the Cole Motor Car Co., Inc., of New York. Eastman has been an active force in local automobile circles since 1919 when he came to New York from Philadelphia, where he was president of the Packard Philadelphia Co.

COL. CLIFTON DECORATED.

BUFFALO, Nov. 6—The medal of the Legion of Honor was recently conferred upon Col. Charles Clifton, chairman of the board of the Pierce Arrow Motor Car Co. Lieut. Col. C. P. Franchot, French consular agent, made the presentation. The decoration was in recognition of work in behalf of the fatherless children of France.

PIERCE-ARROW REDUCES DEFICIT

BUFFALO, Nov. 4—Pierce-Arrow Motor Car Co. reports an operating income of $11,209 for the three months ending Sept. 30. Interest, taxes and other charges were $351,178, which left a deficit of $339,969 as against a deficit of $2,109,999 in the same period last year.

FINED FOR SHORT GASOLINE SALES

CHICAGO, Nov. 3—The two proprietors of a south-side garage were fined $25 each, and costs, by Judge Richardson on charges of having sold short measure gasoline. The case was made by the city sealer in the course of a campaign to eliminate cheating by filling station and garage proprietors.

Iowa Automotive Merchants Meet at Des Moines Nov. 28

Automobile Men from Every Part of State to Gather for Meet

DES MOINES, Ia., Nov. 7—Automobile men from every corner of the state will gather here Nov. 10 for the annual convention, A. J. Knapp, secretary of the association, stated that this year's program has been so condensed that the convention will take but a single day.

An impressive group of speakers chosen from leaders in the automotive industry has been invited to address the meeting. Among these are: Gordon Lee, chief of the automotive division of the Department of Commerce; N. A. Hawkins of the Chevrolet Motor Co.; Alfred Reeves, manager of the National Automobile Chamber of Commerce; and David Beecroft, directing editor of the Class Journal Company. Lee has already accepted the invitation and will speak. Gov. N. Kendall will make the address of welcome, opening the meeting.

In addition to the program of speeches the association will elect a president, vice-president, treasurer and fifteen directors for the coming year. President, E. L. McKibben has appointed a nominating committee of seven to handle the matters preliminary to the election.

TRUCK CONSTRUCTIVE PROGRAM

DETROIT, Nov. 4—A vigorous constructive program for 1922-23 was outlined at a meeting of the National Association of Motor Truck Industries held at the Detroit Athletic Club recently. The speakers were M. L. Pulcher, president of the association; Don Whittaker, general manager; C. A. Musselman, C. A. Vane, general manager of the Automobile Dealers' Assn.; Tom Snyder, secretary of the National Assn. of the Commercial Haulers and also secretary of the Transfer and Warehousing Assn., and S. B. Hadden of the Allied Motor Commerce. The program of the association calls for constructive education of the motor truck dealer.

KNOX TIRE CO. REORGANIZED

MOUNT VERNON, N. Y., Nov. 6—There has been a reorganization of the Knox Tire & Rubber Co., whose plant here was recently purchased by the reorganization committee for $175,000. F. O. Levering will continue as president, while George Jones succeeds F. D. Spencer as secretary-treasurer.

GASOLINE PRICE AGAIN REDUCED

CHICAGO, Oct. 31—Another cent was taken from the price of gasoline today by the Standard Oil Co. of Indiana. The service station price in Chicago is now 20 cents a gallon and the tank wagon price is 18 cents. A reduction of two cents a gallon was made about a month ago.

Factories Still Behind in Filling Enclosed Car Orders

October Production Rate Brings Year Close to Laurels of 1920

NEW YORK, Nov. 6—Not only has October with its estimated output of 244,000 cars and trucks been the seventh consecutive month of the year to show production in excess of 200,000 but it has brought the figure for the ten month period to within a few thousand of the total output for the best previous year in the production history of the industry. Thus far the aggregate for 1922 is 2,119,227 as compared with 2,205,197 in 1920.

Factories are still behind in filling orders for enclosed cars and are hampered in making deliveries by the unsatisfactory rail situation. It is probable that there will be a tapering off in production in November although there is no evidence now that the demand for cars is showing very notable signs of weakening. This is the season when in other years the slowing up in sales has been pronounced. Manufacturing efforts are centering chiefly on enclosed models for which there has been an exceptionally brisk demand.

Taken in conjunction with the remarkable record for the month, reports from all parts of the country show that there is only a negligible stocking of open cars. At present, it is not likely that there is more than one month's supply of this type in dealers' hands or on the road to dealers. This fact indicates that the entire production is being sold and that manufacturers are not producing in excess of actual demand.

Practically the only section of the country where there has been any accumulation, and that in very small numbers, is the Northwest. In that section, however, there is a pronounced feeling that such reserve is necessary to take care of the farmer demand which is expected to appear as soon as the return from this year's crops are received.

N. A. C. C. Service Meeting Nov. 14 and 15 in Chicago

NEW YORK, Nov. 6.—Preparation for the convention of N. A. C. C. factory service managers in Chicago on Nov. 14 and 15 have practically been completed. The sessions will be held in the La Salle Hotel. Tuesday morning Thomas J. Hay, president of the Chicago Automobile Trade Assn., will make the address of welcome and the scheduled talk for the first day will be made by H. J. Leonard, vice president of the Stephens Motor Car Co. The remainder of the day will be devoted to discussion of selected topics. On Wednesday the subject to be considered will be automotive service associations, their relations and benefits to the factory, dealer and car owner. One speaker will be selected to talk from each viewpoint. B. B. Bachman, chief engineer of the Autocar Co., and president of the S. A. E., will speak from the viewpoint of the manufacturer.

Automotive Christmas Is Theme of New A. E. A. Sticker

CHICAGO, Nov. 6—The second of the Automotive Equipment Assn.'s series of merchandising stickers has been issued and distributed to manufacturers and jobbers for distribution in turn to dealers.

The new issue is directed toward Christmas tree and holly decorations, and bears the legend: "A big chance for profits and we've all been passing it up—Automotive Gifts for Christmas." About 500,000 of these will be distributed. A new issue is planned for each month this winter.

JUDGMENT AGAINST BUYER

WICHITA, Kan., Nov. 6—Judgment against the buyer of a stolen car for the return of the car and in addition actual and punitive damages has been awarded by a jury in the United States District Court here. The case was brought by the Indemnity Co. of America against C. E. Mackey, a banker of Cimarron, Kan. The car, a Cadillac valued at $4000, was practically new when stolen. When found in the possession of the defendant it was said to have depreciated to the extent of $2000. The cost of recovery was put at about $500. The court ordered a verdict of $2500 actual damages and $500 punitive damages, holding that the fact that the engine numbers had been filed off should have been sufficient warning to the defendant when he purchased the car that it had been stolen.

MOOCK HEADS HUDSON SALES

DETROIT, Nov. 4—Harry Moock has been promoted to salesmanager of Hudson Motor Car Co., taking the position left vacant by H. B. Phipps, who has resumed charge of the foreign fields in which he created a remarkable record before the war. J. S. Draper has been made assistant salesmanager. He formerly was district manager in the middle east. Moock joined the Hudson company less than a year ago, after resigning the general managership of the National Automobile Dealers' Assn.

THREE MERCHANDISING MEETS

CHICAGO, Nov. 4—Three merchandising meetings were conducted in the latter part of October in the vicinity of St. Louis by E. C. O'Donnell of the Automotive Equipment Assn. They were at Collinsville, Ill., attendance 25 dealers; Belleville, Ill., 200 dealers, and Alton, Ill., 50 dealers.

Automobile Industry in and Near Philadelphia Excellent

Both Dealers and Manufacturers Optimistic Over Winter Outlook

PHILADELPHIA, Nov. 4—In the automobile industry, both manufacturers and dealers in this district report excellent business. Sales of both passenger cars and trucks for the last three months, as a whole, have been far in excess of those for the same period last year, and in some cases the increase has been one hundred per cent or more.

For the first nine months of the present year, sales are reported to have been from sixty-five to one hundred per cent greater than those of the corresponding period of 1921. In fact, demand has been so heavy, in some cases, that production has not caught up with sales and for that reason deliveries have been somewhat delayed. This is true of such concerns as the Packard and the Cadillac. One or two dealers, however, have reported a slight seasonal falling off in sales during recent weeks, and in some instances stocks of new cars are increasing.

Virtually all dealers continue to accept used cars in part payment for new ones, but several state that stocks of second-hand cars will bear close watching, as prices are still on the decline. It is now said to be difficult to sell used cars at their true value.

Methods of paying for new cars is varying considerably. The majority of the low-priced automobiles are financed on a partial-payment plan and, with some firms, as many as ninety-five per cent of all sales are made on this basis. The more expensive cars, however, are being paid for in cash. During recent months, prices have been reduced on several makes, but some manufacturers have not lowered their quotations since January of this year. It is interesting to note that the tendency in the industry is toward the production of comparatively inexpensive cars and that several models to be sold at less than $1,000 soon will be produced.

Foundation for Tire Price Increase Rumor

NEW YORK, Nov. 4—With crude rubber at 23 cents and cotton the highest it has been since the boom days of 1920 there seems to be some foundation for the rumors of possible increases in tire prices.

"I don't like to predict and I won't, but with prices of materials increasing the way they are I cannot see how tire prices can remain at their present level," said the sales manager of one of the big companies. "Tire prices right now are at their very lowest, I think, and these prices, in most cases have been based on crude rubber at 17 cents. None were made at higher than 20.

Sherman Finds Automotive Merchants Eager To Learn How to Increase Their Profits

A. E. A. Merchandising Director, in Tour of Pacific Coast, Held Meetings and Showed "Shop Profits" Picture to Dealers in 25 Cities

CHICAGO, Nov. 4—Twenty-five merchandising meetings in 25 cities is the October record of Ray W. Sherman, merchandising director of the Automotive Equipment Assn., who has just returned from an extensive speaking tour which started at El Paso, Tex., and ended at Yakima, Wash., giving him an excellent opportunity to observe the condition of automotive business in the Pacific Coast states.

"I was most impressed on this trip," Sherman said in an interview with MOTOR AGE, "by the progress of the automotive merchant himself as a business man. For more than 10 years I have traveled about the country meeting groups of men engaged in the automotive business. It used to be that at a public meeting of these men most of them would appear in flannel shirts and many in overalls, and it was in that sort of dress that they met the public in their place of business. At 25 meetings on this trip I didn't see a single man without a white collar and customary business clothes. Even the mechanics who attended the meetings were well dressed. This condition is beginning to be noticeable all over the country."

Sherman said that automotive business at El Paso and at Phoenix, Ariz., his next stop, had suffered this year because the local market depended a great deal upon cattle, cotton and copper, all of which have been low in price. Conditions there are improving rapidly, he said.

From Phoenix he went to Santa Ana, Cal., thence up the coast through Long Beach, Los Angeles, Bakersfield, Fresno, Sacramento, San Jose, Oakland and San Francisco, holding meetings in each place. In these cities he found business thriving and he was especially impressed by the attractiveness of the automotive stores. Neat and orderly arrangement of stocks was the rule and nearly every store had a carefully arranged show window. A remarkable feature was the extent to which successful car dealers are operating accessory and supply departments.

Meetings were held at the following cities in Oregon: Medford, Roseburg, Eugene, Salem and Portland. From Oregon he went into Washington and addressed meetings at the following points: Chehalis, Aberdeen, Olympia, Everett, Tacoma, Seattle and Yakima.

In towns where the "Ask 'Em to Buy" moving picture was shown last year the attendance to see the "Shop Profits" film this year was invariably much better than last year, Sherman said. He believed this was due to the favorable impression made by the first picture. Everywhere he found a very keen interest in the question of increasing profits in automotive merchandising.

Preparations for a good Christmas business were apparent in many places. Some of the large jobbers have prepared to carry out aggressively the "Buy an Automotive Gift" campaign of the A. E. A. dealers nearly everywhere showed a realization of the possibilities of this campaign, Sherman said, and were preparing to cooperate by using local newspaper advertising and by appropriate decoration of their stores and by using suitable wrappers, ribbons or tags for articles most likely to be selected for gifts.

The sales of accessories, Sherman, said, is reaching its greatest volume in articles of practical utility. He mentioned spot lights, bumpers, motometers, windshield wipers, cigar lighters, mirrors, ash trays and heaters as among the items creating the greatest response with the buying public. He said that many articles once considered novelties, as cigar lighters and ash trays, are coming to be considered necessities, and are very easily sold if the car owner's attention is called to them.

A striking instance of profitable "asking 'em to buy" was observed by Sherman at one of his stops. A car dealer who has a gasoline filling station used to asked the customer, "How many gallons?" He changed that question to "Shall I fill it up?" The result thus far has been to add an average of two gallons to every gasoline sale he makes.

Sherman said he found a number of car dealers who were reaping very satisfactory after-sale profits by keeping car purchasers coming back to them for all supplies, accessories and maintenance. He emphasized the importance of this to the automotive merchant who wants to maintain his store on a profitable basis the year round.

The total number of persons attending merchandising meetings of the A. E. A. in October on the Pacific Coast and elsewhere was 7320.

FORDSON SHOW AT WASHINGTON

WASHINGTON, Nov. 4—Attended by 53,000 people, the Fordson Tractor Industrial Exposition closed its week's exhibition in the nation's capital. The exhibit was given under the joint auspices of the Washington branch of the Ford Motor Co. and of dealers in the District, Maryland, Virginia and West Virginia.

Motor Truck Industry in "Wonderful Shape" Now

Doing 75 Per Cent More Business Than at Beginning of Year

NEW YORK, Nov. 4—The motor truck industry, all things considered, is in wonderful shape at the present moment. It is doing 75 per cent more business now than it was at the beginning of the year; all its plants are busy, some of them at capacity, and new markets have been opened that promise much business in the immediate future. September was a rare production month, showing an increase of 35 per cent over the same month a year ago.

These are the conclusions reached by F. W. Fenn, secretary of the motor truck division of the National Automobile Chamber of Commerce, after two weeks spent in visiting 15 factories in different parts of the country.

"General business is the barometer of the truck industry," said Fenn. "When business is good we will sell trucks and lots of them, and I am glad to report that business is coming back. There is a labor shortage in all the industrial centers, the demand for trucks is surprising everyone and new markets are opening for us which tell us that we are just scratching the surface.

"Of great benefit to the industry is the decisions of the public service commissions of New York and California which have held that trucks and buses are necessary to the public and have granted franchises for the operation of bus lines despite the protest of trolleys.

"I also feel that the farmers are going to prove mighty good customers. As soon as they sell their crops and get some ready money, I think we are going to hear from them in a substantial way."

FIAT'S BIG REDUCTION

NEW YORK, Nov. 6—Fiat has announced a radical price reduction on its large 4-cylinder line, model 505, and 6-cylinder cars, model 510. Model 501, the small 4-cylinder line, remains unchanged. The new prices are as follows:

Model 505	Old Price	New Price
Touring	$3,500	$2,500
Sedan	5,000	2,900
Landaulet	4,700	2,900

Model 510	Old Price	New Price
Touring	$5,400	$3,700
Landaulet	5,500	4,500
Brougham	5,500	4,500

LENSES DECLARED ILLEGAL

ALBANY, N. Y., Nov. 7—Sixty-nine of the nearly 100 automobile headlight devices previously approved for use in New York state have been declared illegal by the State Tax Commission. The final list will not be announced until several other manufacturers have had a hearing.

Bennett Hill With Miller Motor Wins Coast Race

Berkeley, Cal., Trophy Goes to Hill — Elliott, Murphy Follow

BERKELEY, Cal., Nov. 4—Bennett Hill and his Miller-motored racer won the 100 mile race here Sunday in 52 min. 38.4 sec., an average of 114¼ m.p.h. Frank Elliott was second, a quarter of a mile behind the winner. Jimmy Murphy won third from Harry Hartz by an eyelash.

Hill took the lead at the start and was never headed, driving through without a pit stop and coming in on ragged tires rather than risk losing the race to Elliott by stopping to change them. Tommy Milton was hit in the face by a splinter from the board track thrown up by the car ahead of him and was put out of the race in the first lap. The splinter smashed Milton's goggles and drove a fragment of glass into the ball of the right eye. He drove into the pit blinded and was rushed to a hospital in Petaluma where specialists summoned from San Francisco reported that the eye would be saved.

This was the last race of the season on this track, the next event on the coast schedule being the Thanksgiving Day races at Los Angeles. Today's races were preceded by motorcycle sprint races.

The results of the motorcycle races: 10 mile, won by Ralph Hepburn, Jim Davis, second; Ray Weishaar third; time 5 min. 42 sec. Twenty miles: Won by Ray Weishaar; T. Terry, second; A. H. Sarkesian, third; time 11 min. 48 sec.

CHICAGO LEADS IN FRANKLIN SALES

SYRACUSE, N. Y., Nov. 4—Chicago took first place honors among Franklin dealers in the matter of sales in the first nine months of this year. During the same period last year, Chicago was in second place. Los Angeles was second in the race this year, San Francisco third, Pittsburgh fourth and Boston fifth.

During the week ending Oct. 21, designated as sedan week by the Franklin organization throughout the country, more Franklin sedans were sold than ever before in any one week. Boston and Philadelphia tied for first place honors, Albany, Syracuse and Reading tied for second place, and Rochester and Greenville, S. C., tied for third place.

NEW BODY PLANT IN LOUISVILLE.

LOUISVILLE, Ky., Nov. 6—A $600,000 automobile body manufacturing concern, with the Mengel Co. as the principal stockholder, will begin operations here early in 1923. It is understood that Durant interests are responsible for the formation of this new company, which will be only one of a half dozen body building concerns that will work on the bodies which Durant will require in his operations the next year.

The new company, known as the Mengel Body Co., will occupy a 30-acre site at Fourth and G streets. Buildings will be erected south of the Southern Railway and will have track connections also with the Louisville & Nashville railroad. Construction will be started at once. Plans are being made to manufacture 30,000 bodies during the first year and to give employment to 500 men.

500 Production Men at First S. A. E. Meeting

DETROIT, Nov. 4—Five hundred production men attended the first S. A. E. production meeting held here Oct. 26 and 27.

The problem of eliminating gear noise by means of more accurate production methods was prominent in the discussions. K. L. Herrman of the Studebaker Corp., in his paper on "Production Errors in Gears," gave the results of intensive research conducted by his company in an effort to eliminate gear troubles and thus give the owner a mechanism which will operate more smoothly. H. J. Crain and J. Brodie of Packard also discussed methods of reducing gear noise.

A. B. C. Hardy, president of the Olds Motor Co., was the chief speaker at the production dinner, held at the Hotel Statler, Thursday evening. Pierre S. duPont, chairman of the board of General Motors Corp., also spoke briefly, while B. B. Bachman, president of the Society of Automotive Engineers, acted as chairman.

McMULLEN APPERSON TREASURER

CHICAGO, Nov. 4—In the refinancing of the Apperson Bros. Automobile Co. of Kokomo, Ind., Roger B. McMullen of Chicago, a pioneer in the automotive industry, has been made treasurer, and A. S. Terrill of A. S. Terrill & Co., investment securities, has been added to the directorate. McMullen was in the bicycle and supply business before the days of the automobile as the Roger B. McMullen Co. of Chicago. In 1902 he organized in Chicago the American Motor Car Manufacturers Assn., which was the predecessor of the present National Automobile Chamber of Commerce. He acted as its secretary and manager for one year. He has since been connected with the A. L. Smith Co., Hydraulic Pressed Steel Co., and Hale & Kilbourne Co., Philadelphia, all connected with the automotive industry.

NASH SALES UP 95 PER CENT

KENOSHA, Wis., Nov. 4—The Nash Motors Co. reports its net earnings for the first nine months of the year as $5,025,441.19. Sales figures for the first 10 months of 1922, according to a statement by C. W. Nash, president, show an increase of 95 per cent over the corresponding period of last year. The company has been oversold practically all year despite a considerable increase in manufacturing capacity.

A. A. E. M. to Hold Its Annual Convention, Nov. 14

New Constitution and By-Laws to Be Adopted at Chicago Meeting

CHICAGO, Nov. 4—The Association of Automotive Equipment Manufacturers, of which George Fritz is general manager, will hold its annual convention at the Congress Hotel, Chicago, Nov. 14. The principal business will be the adoption of a new constitution and by-laws, draft of which had been approved by the board of directors and published in pamphlet form. Another matter of business will be the enrollment of new members, a number of whom have indicated their desire for membership. The present membership is 85 manufacturing firms.

The association has issued a prospectus which outlines the various departments and activities of the organization, which is being expanded into a national organization. The following departmental activities are listed: Exchange of trade information, credit reports; research department conducting the following activities—data showing business done by years and months with percentage of increase or decrease, comparison of collections, comparison of production cost, business administration; jobbers' department including suggestions to help the jobber meet his problems in the distribution of automotive equipment; foreign trade department; information bureau.

A zone system of organization has been tentatively worked out with a director to be elected from each of seven territorial zones it is planned to have meetings once a month in each zone of the members in that zone to consider trade problems. The following zones have been established tentatively with suggested headquarters:

Western zone, headquarters, Chicago; Eastern zone, headquarters at New York; New England zone, headquarters at Boston; Middle western zone, headquarters at Cleveland; Southwestern zone, headquarters at St. Louis; Northern zone, headquarters at Minneapolis; Pacific Coast zone, headquarters at San Francisco.

TO FORBID SIREN WHISTLES

CHICAGO, Nov. 4—Siren whistles on automobiles are a menace to health declared Health Commissioner Bundensen in a public statement warning the users of such whistles that they will be summoned to court. A number of physicians are said to have complained to the Health Department that the lives of patients are being endangered by whistles, horns and other noise-makers on automobiles. A city ordinance prohibits the use of sirens working off the engine exhausts.

Hudson-Essex Discontinues Four Enclosed Car Models

Brings Line Down to Seven Types So That Dealers Can Concentrate

DETROIT, Nov. 6—Hudson Motor Car Co. has reduced the number of Hudson and Essex models to seven by taking out of its line the four expensive enclosed models, including a touring limousine, limousine, cabriolet and sedan. This is a material change from past policies, for in one year Hudson and Essex produced as many as 12 different body types. Before Essex came into being there was one season in which Hudson alone had nine models. The new policy is to enable the dealer to concentrate on a few fast selling models rather than to attempt to cover the entire field of motoring demands.

The enclosed car proportion of the entire Hudson-Essex production now is 56 per cent and even this will be greatly increased in 1923.

This decision is made to aid in the carrying out of the Hudson company's new dealer finance plan which aims to lessen the problem of the dealers handling the line, which has just been announced. Realizing the financial problems of the smaller dealer, the Hudson company has developed a plan which permits of the handling of cars throughout the year at an unusually small expense. The details are very much along the lines of the usual national financing scheme, but it is claimed the expense to the dealer is so small and that the plan so combines the virtues of dependability and economical interest charge on the money advanced that it cannot help but be successful.

NEW FOREIGN SHOW ENTRIES

NEW YORK, Nov. 4—De Dion Bouton and Voison of France, and the Hispano-Suiza of Spain, have been added to the list of exhibitors who will be in the Automobile Salon which will be held at the Hotel Commodore, New York, Dec. 3-9 and in Chicago Jan. 27-Feb. 3. This will mark the debut of the Voison in this country and the return of De Dion Bouton, which has been out of the American market for six years.

John E. Stelling, formerly salesmanager of the De Dion Bouton selling branch in New York, has become importer of both the De Dion and the Voison, while Hispano-Suiza has formed an American connection with the Hispano-Suiza Motors, Inc., of which A. B. Caragol is president and Alfred E. Manning, sales director.

TO TRY REAR LAMPS

BOSTON, Nov. 4—Motor Vehicle Registrar Frank A. Goodwin of Massachusetts has set Monday, Nov. 13, as the date upon which he will test out the rear lamps submitted to him by motor vehicle and lamp manufacturers to see if they comply with the new regulations of the Bay State. While the regulations are new, the law is the same as when passed first, requiring that rear numbers be visible plainly at 60 feet.

U. S. Department of Commerce to Aid Motor Films

WASHINGTON, Nov. 4—Gordon Lee, chief of the automotive division of the Bureau of Foreign and Domestic Commerce, United States Department of Commerce, announces that the Continental Motors Corp. of Detroit, has decided to cooperate with the United States Department of Commerce in the production of motion picture film covering the complete mechanical functions of an internal combustion motor. This work will be under the direction of G. W. Yeoman, vice-president of the Continental, cooperating with M. F. Leopold, the government motion picture engineer.

Government officials state that the Automotive Library consists now of educational films embracing representation of six cylinder motor cars of two distinct types and an eight cylinder "V" type motor car, which in conjunction with this new film, will permit the government to most effectively promote American automotive interests in every country in the world. More than 400 requests have been received from various foreign countries for these films to be shown in universities and educational institutions and motor trade associations.

"BUYING" SHOW AT BRIDGEPORT

BRIDGEPORT, Conn., Nov. 4—Not only was the enclosed car show of Bridgeport Automotive Assn. last week at the State Armory an exhibit, but it was a "buying one," according to those having it in charge and the various exhibitors. So successful was the program for those who had a part in it, that others are planning a second exhibit at the same place, probably the week of Nov. 6. Afternoon and evening sessions were held, with appropriate programs of entertainment. The Armory was appropriately decorated. Credited with being the first exhibit here given over exclusively to enclosed cars, the primary object of the occasion was to call attention of the public to the comfort and convenience of the motor vehicle. Leading makes of the enclosed type of cars were exhibited.

WHEELING DEALERS ORGANIZE

HUNTINGTON, W. Va., Nov. 3—Automobile dealers of Huntington, at an enthusiastic meeting in Hotel Frederick, formed a permanent organization and elected officers to serve for the next year. Approximately 70 per cent of the automobile companies of the city were represented. The following officers were chosen: Theodore Cavendish, president; J. E. Curtis, vice-president; W. R. Titus, treasurer, and B. R. Osborne, secretary.

Fall Brings Slowing-Up of Open Car Sales in N. Y.

New York City Dealers Find Stock of Open Cars Growing

NEW YORK, Nov. 7—Late October and early November have brought a decided slowing up in demand for open cars in the metropolitan territory. Open cars are coming in from the factories, some by freight and some in driveaways, but they are moving much more slowly and in some cases not at all from the establishments of distributors and factory branches. There is beginning a noticeable, though not alarming, accumulation of open car stock.

Outside the large retail centers of New York, Brooklyn and Newark the open car demand also has fallen flat, but dealers as a rule have only small stocks and a good many, because of used car inventories and lack of ready credit, are not accepting them in any considerable numbers. Unless there is a slowing up of the flow of open cars from the factories there are indications that some wholesale organizations hereabouts will have accumulated rather large stocks.

There are a number of exceptions of course to the general condition. A very small number of the fastest selling makes are moving quite a good many open cars because enclosed cars are not obtainable except on long deferred deliveries.

The enclosed car shortage is general. Two or three popular lines are booking sedan and coupe orders for early 1923. Others cannot make deliveries for a month or more at the earliest. Some makes fairly well down the list of "best sellers" are woefully short of enclosed models. This condition is helping dealers in some cars of lesser popularity.

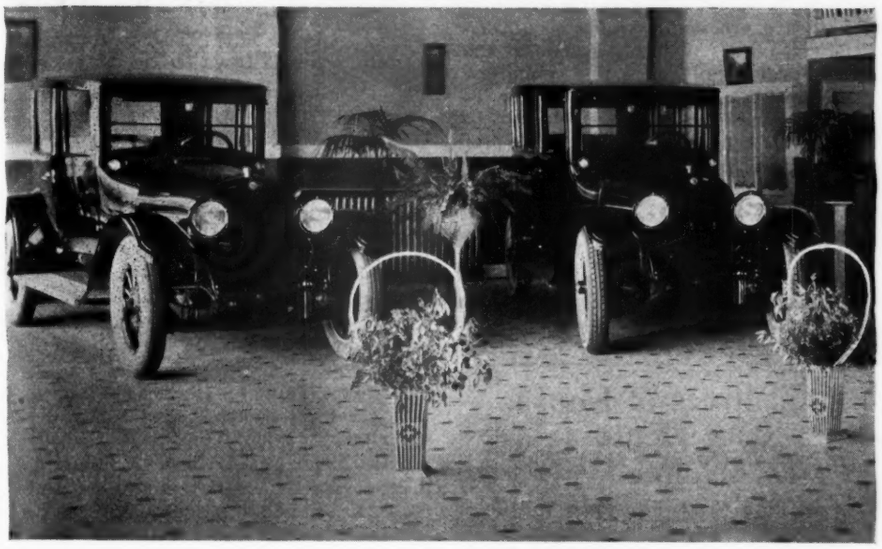
TO DRIVE OTHER FELLOW'S CAR

CLEVELAND, Nov. 5—Cleveland automotive engineers are for a period going to drive their competitors' cars. The engineer of the Chandler Motor Co. is going to drive the car owned by the engineer for the Peerless Co. and the Chandler engineer is going to loan his car for a day to the Peerless engineer.

George H. Graham, vice-president of the Chandler Motor Co., started the swapping idea among the engineers last Friday when he addressed them at a regular meeting which was held in Hotel Winton. Graham told the engineers that by driving a competitor's car for a day or two the engineers would learn about latest developments in other fields than his own and that he could talk more intelligently to his own organization and in addition his own vision would be broadened.

Engineers in the audience liked the idea so well that they adopted it and several present volunteered to loan their cars on an exchange basis.

Enclosed Car Show for a Small City



This photograph made in the show room of H. C. Bradley, Fort Collings, Colo., strikingly illustrates the high type of enclosed car show which was given there through the cooperation of R. R. Hall Cadillac Co., Denver

U. S. Will Use 5,670,000,000 Gallons of Gasoline in 1923

WASHINGTON, Nov. 6—Gasoline consumption for the calendar year of 1923 will be 5,670,000,000 gallons, it is estimated by the American Petroleum Institute. The figure is arrived at by an estimate showing that there will be 13,500,000 gasoline engines in use in 1923, each using an average of 420 gallons of gasoline.

At the present rate of refining methods—one barrel of gasoline secured from each four barrels of crude, the total petroleum requirements of crude oil will be 540,000,000 barrels.

IMPROVEMENT IN TRUCK SALES

COLUMBUS, O., Nov. 4—There is marked improvement in the demand for trucks and commercial vehicles of all kinds in Columbus. Dealers in trucks are united in saying that there is a considerable improvement in business conditions generally and that inquiries for all styles of trucks are much more numerous than for several months.

While business is running largely to the lighter style of vehicles, such as delivery wagons, still there is a good increase in the demand for the heavy trucks.

PHILADELPHIA TRUCK MEN MEET

PHILADELPHIA, Nov. 3—For its first fall meeting, the Motor Truck Association of Philadelphia held a "Night in Bohemia," at the Adelphia Hotel. Speeches were curtailed and a vaudeville and musical show was provided by Chairman R. Arthur Bittong. President Thomas Quirk presided.

F. H. Williams, chairman of the legislative committee, reported that there would be some important data to be laid before the association at its next meeting, with regard to the license fee question. In discussing the used truck problem, Williams stated that he thought it was an individual matter for each distributer to determine for himself, and stated his disbelief in any general rule of practice for the trade.

Walter Y. Anthony, former president of the association, also spoke and expressed the opinion that the used car plan in operation in the Philadelphia Automobile Trade Assn. probably would work out better in the passenger car field than it would in the field of trucks.

17,666 BUICKS IN OCTOBER

DETROIT, Nov. 4—October was the best month in the history of the Buick Motor Co. Production was 17,666. September production was the best previous month, with 16,482. Shipping records were made during the month as follows: Oct. 12, 775; Oct. 25, 910; Oct. 26, 973; Oct. 30, 1,029.

ELECTION OF WATERLOO DEALERS

WATERLOO, Ia., Nov. 6—Sixty members attended the annual meeting of the Blackhawk County Automobile Dealers' Assn., at which Harter B. Hull, Waterloo, was elected president; J. N. Collar, Cedar Falls, vice-president; F. B. Hupp, Waterloo, secretary, and W. M. Orr, Waterloo, re-elected treasurer.

PARIS RECEIPTS $140,000

PARIS, Nov. 7—Gate receipts at the Paris automobile show totaled 1,817,000 francs for the 12 consecutive days this exhibition remained open to the public. At present exchange, this is equivalent to $140,000. The total number of visitors to the show has not been indicated, but the greatest number on any one day was 40,000 in the Grand Palais and 23,000 in the overflow building.

"Traveling" Enclosed Car Show Makes Debut in West

Dealers in Three Small, Progressive Towns Stage Own Novel Exposition

DENVER, Colo., Nov. 6—Three progressive towns in Colorado and one in Wyoming were treated recently to a novel and practical motor enterprise in the form of a "traveling" enclosed car show, staged two days in each town by the local Cadillac dealer, through the cooperation of the R. R. Hall Cadillac Co., of Denver, distributor for these two states and Western Nebraska.

The distributing firm supplied four enclosed models for these unique exhibits, and sent its territorial salesman, W. B. Taylor, to supervise the shows. The local dealers decorated their salesrooms and advertised the events to their respective communities, and the results were highly gratifying to all concerned—including the public, which expressed both interest and delight. The shows were welcomed as events well worth considering as an asset to civic pride, and they served to stimulate a broader appreciation of the automotive industry's representation in these communities.

Shows Produce Sales

The towns visited on this first circuit were Boulder, Fort Collins and Greeley, Colo., and Cheyenne, Wyo. The attendance at the four shows was estimated, respectively, at 1,000, 1,200, 800 and 1,500 The local dealers participating at the respective points were Bolinger-Mitchell Motors, Inc., H. C. Bradley, Sherman Auto Co. and Mentz Motor Co.

There was an average of one enclosed car sale in each of the towns as a direct result of the two-day show, Taylor reports, and all the dealers made worthwhile additions to their lists of prospective customers. Other dealers in the territory are asking for similar cooperation, and the distributing firm plans to continue this show program each fall, gradually increasing the number of towns visited in order to cover the territory as fully as possible.

A. E. A. SHOW, NOV. 13

CHICAGO, Nov. 6—The seventh annual convention and the fourth annual show of the Automotive Equipment Assn. will open at the Chicago Coliseum Monday, Nov. 13, and continue until the afternoon of Friday, Nov. 17. Both events will be open only to members of the association and their accredited representatives. It is announced that a one and one-half fare round-trip rate for the convention has been granted by the various railway passenger associations.

TO INCREASE TIRE PRICES

NEW YORK, Nov. 4—The Mason Tire & Rubber Co. will advance tire prices approximately five per cent Nov. 15.

How Great Britain Plans to Restrict Output of Rubber

Rubber Association of America Appoints Committee to Confer With London Interests

NEW YORK, Nov. 4—Great Britain's sanction of the plan to restrict output by means of a graduated scale of export duties on all rubber shipped from Ceylon, Malaya and the Straits Settlements has resulted in the appointment of a special committee representing the Rubber Association of America "to proceed with an investigation of the effect of the proposed crude rubber restriction." This committee will at once take steps to bring about close contact with the Rubber Growers' Association of London for the purpose of giving joint consideration to the development of a plan for safeguarding the interests of the crude rubber grower and the consumer.

Directors of the Rubber Association of America held a special meeting for the purpose of naming this committee, which consists of: Chairman, H. Stuart Hotchkiss, president of the United States Rubber Plantation Co. and attorney for the United States Rubber Co.; B. G. Work, president of the B. F. Godrich Co.; Horace De Lisser, chairman of the board of directors of the Ajax Rubber Co.; A. H. Brown of Meyer & Brown, crude rubber importers and S. C. Carkhuff, secretary of the Firestone company.

Committees Discuss Issues

This committee at once cabled the Rubber Growers' Assn. asking that a committee be sent here to discuss plans which will protect mutual interests of consumers and producers. Chairman Hotchkiss, in the cable, declared that "it is thought the proposed restriction carries with it great danger to the entire industry, planters and manufacturers alike, and that closer contact between the growers and consumers will be beneficial to the industry as a whole."

The special meeting of the Rubber Association's directors was brought about by the sharp advances in the price of crude rubber which followed the announcement that the British government had sanctioned the proposed taxation plan. Members were anxious to have determined for them the effect of restriction on the stability of the industry. Several suggestions were received by the directors, such as enlisting the aid of the Departments of State and Commerce of our own government and also cabling a protest against the passage of this restriction act to the colonial governments of the Far East. The appointment of the Hotchkiss committee was the compromise reached.

The restriction was to go into effect Nov. 1, the idea being to limit production until prices become more satisfactory. The scheme adopts as the standard production the actual output of each producer during the 12 months, Nov. 1, 1919 to Oct. 31, 1920—amplified in accordance with certain rules adopted. In lieu of existing export duties a minimum export duty is to be levied on that percentage of standard production which is allowed to be exported under the scheme at the minimum rate of duty, the committee recommending that this minimum be fixed at the lowest possible rate, not to exceed one penny per pound. If a producer desires to export a quantity greater than that allowed to be exported at the minimum rate of duty he will be called upon to pay an export duty on his total export during the period of 12 months, ranging from 4 to 12 pence per pound. The percentage exportable at the minimum rate is 60.

Objectives of Kansas City Dealers Defined

KANSAS CITY, Mo., Nov. 5—Following are among the objectives of Nelson S. Riley, president, and the new board of directors of the Kansas City Motor Car Dealers' Association for the coming year:

Cultivation of spirit of fellowship.
Daily luncheons for dealers.
Monthly meetings for sales executives and managers.
Occasional meetings of sales forces.
Co-operation on closing hours and Sunday closing.
Development of used car co-operative program.
Promotion of the annual show, with equal emphasis on passenger cars and trucks.

President Riley also hopes to bring about discussion of a new plan for pricing cars, whereby cars will be sold at a term price, with 6 per cent interest on balance, and a 5 per cent discount for cash, rather than on a cash price basis, with 8 per cent fee on the deferred payment.

McCONNELL RESIGNS FROM KLAXON

NEW YORK, Nov. 6—D. A. McConnell has resigned the presidency of the Klaxon Co. of Newark, N. J., effective Dec. 31, although his active connection with the company ceased Oct. 15. As yet he has formulated no plans as to his future business connections. With F. Hallett Lovell, Jr., McConell formed the Lovell-McConnell Manufacturing Co. in 1906, to manufacture the Klaxon horn, which was one of the pioneers in the electric warning field and which was invented by Dr. Miller Reese Hutchinson.

SHULER AXLE CO. REORGANIZED

LOUISVILLE, Ky., Nov. 8—After several months of reorganization, the Shuler Axle Co., Inc., of Louisville, is again in active operation. The refinancing program has been completed.

The official personnel of the company has been rounded out by the appointment of W. E. Dugan as vice-president and general manager, and the reappointment of F. A. Shuler as director of engineering and manufacturing. The Shuler factory is rapidly being placed in full production on a complete line of front axles for motor coaches, trucks, tractors and trailers.

Ohio Clubs Campaign for Open Highways This Winter

Tractors and Plows to be Stationed at Various Points Where Snow Is Heavy

COLUMBUS, O., Nov. 6—Ohio automobile clubs affiliated with the Ohio State Automobile Assn. have launched a campaign to insure adoption of proper measures to keep highways of the state open during the coming winter. The state highway department and county officials have been called upon to support the movement.

Highway Director Herrick, in answer to a recent letter from Fred H. Caley of Cleveland, president of the State Automobile Assn., urging need of immediate arrangements for snow removal on state roads, has announced such plans are being prepared.

The state highway department, Herrick states, proposes to station tractors and equipment with snow plows and scrapers at various points in Ohio, particularly in northeastern Ohio, where heavy snowfall may be expected. The intent is to keep the principal thoroughfares open at all times during the winter.

USED CAR PLAN CHANGED

SPRINGFIELD, Mass., Nov. 6—At a meeting of the Springfield Automotive Dealers' Assn. it was decided to adopt a plan of procedure governing used car transactions that shall closely approximate that which has been pursued in Boston, eliminating some features of the plan introduced here last winter, which met with persistent opposition from some members. This action was taken following a report of an investigating committee which had consulted different authorities.

The new plan provides for regular reports on all used car purchases by the dealers and looks to price stability and standardized practice in rehabilitating cars bought for resale. At the same time it does away with the strict rating of all makes and conditions of cars on an age basis. As a result of the latest action, it is expected that the Springfield Automobile Board of Trade, which has dealt with the used car situation for the past eight months, will soon be dissolved and the problem be handled directly by the association.

BOSTON DEALERS MEET

BOSTON, Nov. 7—The Boston Automobile Dealers Assn. held a meeting and dinner at the Kenmore Hotel which is to be a forerunner of others that will begin to put the association more in the lime-light, and have it take an important place in the affairs of New England. The keynote of the meeting was co-operation. While the main theme was a discussion of the used car problem other matters were touched upon.

BUSINESS NOTES

Reo Motor Co. is planning to install a new air compressing system and also add to its enameling ovens. With this new equipment the total expenditure by the company in 1922 for machinery to increase and improve production will reach about $500,000. Sales are reported to be in excess of production at the present time, due in part to material shortage occasioned by the railroad situation.

Jenkins Vulcan Spring Co. reports that September business was the largest in the history of the company. Shipments for the month of October ran considerably in excess of those of September and the plant is operating 20 hours a day every day in the week with a large percentage of the increased business coming from old established accounts.

Increased prosperity of the company and the favorable outlook for a continuation of good business are the reasons given by the directors of the Packard Motor Car Co. for the declaration of a 2½ per cent extra dividend in addition to the regular quarterly dividend of 2½ per cent in cash on the company's common stock.

The Philadelphia Storage Battery Co. and the Vesta Battery Corp. have become members of the Automotive Electric Assn. Philadelphia will be represented in the association by James M. Skinner, vice president, and W. S. Crammer, sales manager. Vesta will be represented by F. S. Armstrong, secretary and sales manager.

Directors of Gray & Davis, Inc., have declared an initial quarterly dividend of two dollars per share on the new preferred stock, payable Nov. 1 to stock of record Oct. 27.

Hood Rubber Products Co. reports sales approximating $18,100,000 for the first nine months of 1922 as compared with $17,218,416 for the corresponding period of 1921. Of this, sales of tires were about 25 per cent in value.

C. W. Walker and R. J. Montgomery, as the Walker-Montgomery Supply Co., Kansas City, Mo. have filed petition in bankruptcy and were adjudicated, listing $21,451 obligations and $14,386 assets.

Gale E. Stucker, manager and owner of the I-Ne-Da Fender Brace Co., Kansas City, Mo., has filed bankruptcy petition, showing about $3,000 obligations, and assets only of personal effects.

Bankruptcy petition has been filed in Kansas City against the Guaranty Motor Corp., by the Mutual Oil Co., Monark Gasoline & Oil Co., and Tandy Sales Co.

Kolix Products Co., of Racine, Wis., has been organized by Arthur L. Merriam, Robert E. Miller, Dr. S. H. Sauter and E. M. Miller to manufacture and market a new type of dry soap prepared especially for mechanics and motorists.

Larger quarters being necessary, Jauch & Dicus, Ottawa, Ill., have broken ground for a new battery and electrical service station for motor cars, corner of LaSalle and LaFayette streets, which will be four times as large as the present station at 217 W. Main street. The new plant will be ready for occupancy about Dec. 1.

The company manufacturing the F. R. M. timers for Ford cars, which has been located for several years at Weston, Ill., has removed to Fairbury, Ill.

A voluntary petition in bankruptcy has been filed by Elwin A. Peterson and Caleb Johnson, proprietors of the Western Tire Works, 1027 Collins street, Joliet, Ill. Liabilities were listed at $1730, while the assets were given at $1519.

Hayes Wheel Co. of Canada, Ltd., is equipping the factory of General Forgings and Stampings, Ltd., at Merritton, which was purchased recently as a plant for the production of outside automobile rims. The metal stamping equipment will be transferred to the company's plant at Chatham but the forging plant at Merritton will not be disturbed.

At the annual election of officers of the Kokomo Rubber Co. Southern Division, W. A. Harris was elected president and general manager and Rupard C. Day was elected secretary and treasurer. D. L. Spraker of Kokomo, Ind., was elected vice president.

D. C. Black, president of the Atlanta Automobile Assn., an organization of automobile and accessory retailers and wholesalers, advises that the annual meeting of the body will be held Wednesday, Dec. 20, at the Capital City Club in Atlanta. Officers for the ensuing year will be elected and plans outlined for an educational campaign during the first half of 1923.

Kelly-Springfield Motor Truck Co., has located its Columbus, (O.) branch at 560 East Mound street, where a large service station has been opened.

The Asbestos Textile Co. of North Brookfield, Mass., has started a campaign to introduce its Aztec brake lining into New England, and it has opened New England sales quarters at 86 High street in charge of Newton B. Misel.

A new plant, which includes an assembling and repair shop, a warehouse, and a district sales office, was recently opened in Seattle, Wash, by the Westinghouse Electric & Mfg. Co.

Thurston-Palmer Co., State-Lake building, Chicago, has been organized to become exclusive representative for a number of manufacturers of automotive equipment, selling only through recognized jobbers. The company proposes to open branch offices at New York and San Francisco.

Reid Air Spring Co. of New Haven, Conn., manufacturers and dealers in Automobile accessories, has been incorporated with an authorized capital stock of $100,000.

Hayes Wheel Co. has declared a dividend of 75 cents a share, payable Dec. 15 to stock of record Nov. 30. Heretofore the company has been paying dividends at the rate of 50 cents a share quarterly.

Directors of the Studebaker Corp. on Nov. 1, declared the regular quarterly dividend of 2¼ per cent on the common capital stock and the regular 1¾ per cent on the preferred. The extra dividend on the common was eliminated.

Additions to the plant of the Electric Auto-Lite Co., at Fostoria, O., are under way. A large three-story brick building, formerly used by the Allen Motor Co., is being rebuilt on the interior. The second floor of this building will be used for the offices. The heavier machinery of the company will be installed on the first floor. At least four departments will be added when the building is ready.

George L. Campbell, of Davis, Campbell & Co., Columbus, Ga., one of the largest acessory firms in the state, and his wife, Mrs. Marion Campbell, and their infant child, were instantly killed recently when an automobile in which they were riding was struck by a fast train near Waycross, Ga.

Samuel Murray, who has been with the Atlanta branch of the Ford Motor Co. for several years, has been appointed assistant manager. W. W. Mitchell is manager.

A. C. Underwood, for several years identified with the interests of The B. F. Goodrich Rubber Co. of Okron, O., has been promoted to the position of manager of sales for Goodrich bicycle tires, Goodrich motorcycle tires and Goodrich automobile rubber sundries.

Edgar P. Day, who for a number of years has represented The American Exporter and previous to that the Horseless Age, has joined the advertising staff of **El Automovil Americano,** the Spanish automotive dealer paper published by The Class Journal Company, and will make his headquarters in Detroit.

Oscar G. Woolverton, who was associated with the General Motors Truck Co. for 11 years, has been appointed Haynes district sales manager for the state of Texas, according to an official announcement by The Haynes Automobile Co., Kokomo, Ind.

Nathaniel Leverone has resigned as secretary and treasurer of the Hill Pump Valve Co., Chicago, to become secretary of the Advance Lamp Works of Chicago. For a number of years he has been a leader in the Automotive Equipment Assn.

Frederic T. Wood has been elected president and general manager of the Fifth Avenue Coach Co. and the New York Transportation Co., to fill the vacancy caused by the resignation of President John A. Ritchie and Vice President and General Manager George A. Green, who have joined the Chicago Motor Bus Co., as president and vice president and general manager, respectively. Wood will fill the dual role, while R. E. Fielder will continue as chief engineer.

400 Attend Second Conference of Highway Education Body

Engineers, Attaches of Foreign Embassies, Automotive Men make Up Assembly

WASHINGTON, Nov. 4—More than 400 educators, engineers, attaches of foreign embassies and representatives of the automotive industry attended the second National Conference on Education for Highway Engineering and Highway Transport here last week. It marked a long step forward in promoting the construction of highways along lines which will do most to serve the entire nation.

Much attention was given by the educators, representing more than 50 schools and colleges, to the important position which will be occupied in the future by motor transport. They realized that many trained men will be needed to direct this branch of transportation along scientific lines.

There was general acceptance of the program outlined by A. J. Brosseau, president of Mack Trucks, Inc., for the financing of highway construction. It was his contention that the funds for for building roads should be a tax upon property as a whole and that maintenance costs should be met by the users of highways, principally operators of motor vehicles. Brosseau declared that if roads were properly built and properly maintained they would not break down. He argued, however, that careful consideration should be given to the needs of the community to be served and that concrete and other highly expensive materials should not be used when the traffic does not warrant.

W. H. Lyford, vice president of the Chicago & Eastern Railroad, read a paper on "Cooperation versus Competion Between Motor Truck and Railroad Transportation." His conclusions were based upon extensive research. He declared railroads should supplement other service in congested centers by providing cartage for collection and delivery of freight. He asserted also that railroads should abandon unprofitable branch lines and serve the public with motor trucks.

A dozen committees which were appointed to consider various phases of highway and highway transport engineering education will continue their work and it will be several months before their final reports are prepared.

All the delegates to the conference were convinced that motor vehicles will play a tremendous part in the future development of the nation. For that reason they were of the opinion that all branches of the automotive industry should promote by every means possible the expansion of the highway system.

26,876 DURANT EMPLOYES

NEW YORK, Nov. 7—Durant activities, that is, those concerns directly identified with the big corporation and with companies manufacturing parts for it, now employ 26,876 persons in all their plants, which are spread through 25 cities. Of this total, 13,876 are working on materials, 2,250 in sales and distribution and 7,500 in sales and service.

WINS ECONOMY RUN

ALBANY, N. Y., Nov. 6—In a dealers' economy run held here a Velie 58 phaeton was the winner, making an average of 26½ miles to the gallon of gasoline against a wind with the top up.

IN THE RETAIL FIELD

Horsch Motor Co., distributor for the Commerce and United States trucks in Columbus, O., is now located at 608 South High street, having moved into larger quarters.

Moon-Pittsfield Co. has been formed in Pittsfield, Mass., to distribute the Moon car, and sub-agents will be appointed in several other places in the county. Walter T. Dyle and Robert R. Reeves are the principal members.

C. H. Blair has taken over the Thomas Street Garage, service repairs and storage, Springfield, Mass.

S. J. Cordner Co. has opened its large new garage in North Main street, Springfield, Mass., designating it as Station 12. D. H. Cordner is managing the branch.

Andrew Boghosian has bought the Tenth Street Garage, Springfield, Mass., and will continue it as a storage and repair place.

Thomas Gay, hotel man of Streator, Ill., has been given the distribution of the Franklin car in the La Salle county territory and will operate a sales agency and service station at 305 West Main street.

E. W. Arrasmith has opened a Chevrolet agency and service station at 3636 Main street, Kansas City. He was formerly an Oakland dealer there.

Western Auto Supply Co., which has opened 24 new stores in various cities in 1922, making 66 in all, is opening a second Kansas City store, at Fourteenth street asd Grand avenue, in the same block with its present retail store and general headquarters, 1422-24 Grand avenue.

Milford Waddle has taken over the distribution for the entire Dort line at Kalamazoo, Mich. His territory includes Kalamazoo and eight adjacent counties.

Milliman-Curtiss has taken the agency for the line of the Barley Motor Car Co., Kalamazoo, Mich., including the Roamer and the Barley six.

Aldrich Bros. have taken the distribution agency for the complete Durant line in southwestern Michigan and have established a garage and salesroom at 509 West Main street, Kalamazoo. The Aldrich Auto Sales Co., capital $40,000, has been formed in Battle Creek to take over the business given up by Aldrich Bros.

William Elliott Phelps, sales manager of the Barley Motor Car Co., has just returned from Pittsburgh, where he closed a contract with C. J. Freeman to act as the company's distributor throughout western Pennsylvania. Freeman has been acting as distributor for the Templar car, operating under the title of Pittsburgh-Templar Co., Baum boulevard. He will change to World Motor Co., handling the Barley six and Roamer models.

Davis & Culver Automobile Agency, Galesburg, Ill., has been appointed distributor for the Gray car and has already received a carload shipment.

H. B. Knudson Auto Co., 202 East Superior street, Duluth, Minn., sustained a heavy loss by fire which ruined its sales and service building and destroyed 30 cars, tractors and trucks on Oct. 18.

Fellhoefer Bros. Motor Co. of Valmy, Door County, Wis., has completed a new garage and service building, 60 by 80 ft., which replaces the building destroyed by fire on Feb. 23. One of the features of the equipment is the illuminating system, served by an installation of the Delco-Light.

Rahr-Nash Motor Co. of Manitowoc, Wis., which has been incorporated with $25,000 capital stock, to act as Nash and LaFayette dealer is Manitowoc county, has taken over the Hagen Motor Car Co. garage and service building as headquarters. The principals in the new company are William and Niels Rahr and William S. Schrader. The Rahr interests will continue in the present location the business of the Rahr Auto Grinding Co., established several months ago.

Green Bay (Wis.) Motor Car Co. has been appointed Gray dealer by the Daggett-Yewdale Motor Co., Milwaukee distributor in Wisconsin and Upper Michigan.

Robert F. Buggs, Janesville, Wis., Ford dealer, has sold his branch at Milton Jct., Wis., to Clarence Alter, formerly of Manitowoc, Wis.

Grand Avenue Buick Co., Milwaukee, occupying temporary headquarters at 266 Twenty-seventh street since its incorporation as a Buick dealer several months ago, has started construction work on permanest sales and service quarters on Grand avenue at Thirty-sixth street. It will be 65 by 125 ft., one-story and part basement and cost about $30,000 complete. Jack Meehan is general manager.

Tenant Motor, Ltd., 2447 Michigan avenue, Chicago, has filed articles and a statement to do business in Wisconsin. The proportion of capital to be employed is $20,000. Headquarters have been established at 510 First Wisconsin National Bank building, Milwaukee.

Potter Electric Co., Superior, Wis., is building a one-story building, 24x50 ft., at Fifty-eighth street and Tower avenue, to be equipped as an exclusive battery repair and service station.

Lowry Bros. Motor Sales Co., Lake Geneva, Wis., has been organized to act as Essex, Hudson, Maxwell and Star dealer. Headquarters have been opened in the building occupied for nine years by Mat and Dewey Lowry on Broad street as a restaurant.

Dunham-McCumber Motor Co., Fond du Lac, Wis., has been incorporated with $50,000 capital stock to succeed to the partnership business of H. W. Dunham and B. E. McCumber, proprietors of the Nash sales and service station for several years.

Percy B. Williams, formerly Chalmers and Maxwell dealer at 242 Fourth street, Milwaukee, has disposed of his lease to the Schmidt Motor Co., distributor of the Sayers and Anderson. He has purchased an interest in the Neitzel-Wussow Co., 1130 Teutonia avenue, Milwaukee, Chevrolet and Studebaker dealer, and this firm is now known as the Wussow-Williams Co.

Roberts Motor Co., of Valdosta, Ga., has been organized and incorporated with $10,000 capital. The company will operate an automobile agency.

Ponce de Leon Motor Co., of Ponce de Leon, Fla., has been organized and incorporated with $10,000 capital, to operate an agency in Florida territory.

Studebaker agency in Atlanta has leased a new building at West Peachtree and Linden streets, and will shortly move into the larger quarters which provides one of the most modern sales and display rooms in Automobile Row.

Columbia-Kissel Motor Co. has been formed at Philadelphia to take on the distributorship of the Kissel car, which will be handled from 250 North Broad street, where they opened headquarters last week. The organizers of this new company are E. J. Fisk, president, and Samuel F. Levy, secretary and treasurer, formerly Maxwell-Chalmers distributors.

A. T. Mast has been appointed dealer for Franklin cars in Nacogdoches, N. Y., and vicinity.

Sydney J. Morris has been appointed dealer for Franklin cars in Laramie, Wyo. and adjacent territory.

Zeb C. Cummings has been appointed dealer for Franklin cars in Tarbora, N. C. and vicinity.

Pratt Motor & Implement Co., have been appointed Franklin dealer for Newbern, N. C. and vicinity.

Boston—Columbia Motor Co. has given up the Columbia line and the proprietor is now handling the Moon—B. C. Hamilton, who was in charge of sales for the Chandler-Cleveland distributors until they went into bankruptcy, has joined the Brown Motors Co., distributor of the Gray car, as sales manager. Ralph B. Nettson, who was president of the Chandler and Clevland distributing company has gone to Cleveland to accept a position at the Chandler factory. The factory has sent on M. R. Parker as New England branch manager for the Cleveland and Chandler—Plans are being completed to close contracts for the handling of the Earl and the Case cars in Boston, both of which have been without dealer representation for some months.

Arnold Motor Co., 2106-2110 W. Madison street, Chicago, has been incorporated with $30,000 capital to operate an automobile business.

Roberts Motor Car Co., one of the pioneer truck organizations of Portland, Ore., and for several years past representative of Republic trucks, has taken over the distribution of the Federal line, according to arrangements concluded last week. The Republic will be continued.

Temple Auto Supply Co. of New Haven, Conn., has been organized with Bennet D. Lear, as president and treasurer, and Mabel Lear, as secretary.

Wash-LaFayette Co., automobile dealer, has been incorporated at Hartford, Conn., with an authorized capital stock of $100,000.

Republic Sales and Service Co. of Bridgeport, Conn., automobile dealer, has been incorporated, with an authorized capital stock of $50,000.

603 Dealers Attend "Shop Profits" Meeting at Ft. Wayne

Successful Merchandising Event of A. E. A. Sponsored by Four Jobbers

FORT WAYNE, Ind., Nov. 4—What is believed to be one of the largest gatherings of automobile dealers ever held with jobbers as the hosts, was put on here recently by the local jobbers in automotive equipment, the Fort Wayne Iron Store, C. J. Lomont & Co., R. M. Kaough & Co., and the Mossman-Yarnelle Co. Six hundred and three dealers from Indiana, Ohio, Michigan and Illinois were present at the affair which was held at the Anthony hotel and which was the biggest banquet ever served by the hotel.

The event was such a success that it was unanimously determined at the banquet to hold a similar affair each year.

The meeting was primarily arranged as an educational event and as such it proved very successful. The delegates showed a warm interest in the program which had to do principally with giving suggestions for efficiency in shop work, particularly in cutting down waste leaks in the operation of a modern accessory or auto repair shop. A great deal of emphasis was laid on sales psychology which should be employed in the selling of automobile accessories and suggestions were given on the proper way to display accessories and advertise them in order to realize the greatest volume of sales.

Two reels of motion pictures, provided by the Automotive Equipment Assn. of which the local jobbers are members, were shown to the delegates and inspiring addresses were delivered by Robert A. Stranahan, of the Champion Spark Plug Co., of Toledo, and M. B. Ruark, of the Automotive Equipment Assn.

C. H. PAGE GETS AMERICAN MOTORS

PLAINFIELD, N. J., Nov. 6—Carl H. Page, president of the American Motors Corp., has made the final payment of $5,646.48 on the total purchase price of $200,000 set upon the property by the court at the receiver's sale, and the reorganized company of which Page is the head has formally taken over the plant.

Under the re-organization plan put into effect some months ago, interests identified with the original company have provided working capital amounting to about $250,000, and it is announced that the balance of the new company's stock will be turned over to a group of Philadelphia brokers under an arrangement that will net the company an additional amount of $250,000, or $500,000 altogether.

President Page reports that September was the best month in the company's history, and he expects the plant will be running on a 1000 car per day basis within the next 60 days.

CONCERNING MEN YOU KNOW

B. G. Brennan has been appointed general sales manager of the Inland Products Co. of St. Louis which has just moved into its new three story plant.

G. P. Atkinson for several years connected with the home office sales organization of the Weston Electrical Instrument Co. of Newark, N. J., has opened an office in Atlanta for the territories of Georgia, South Carolina and northern Alabama. In addition to Weston instruments, Atkinson has several other nationally recognized lines of electrical equipment.

Charles H. Woodruff, former sales manager of the O. Armleder Co. of Cincinnati, maker of the Armleder truck, died recently following an acute attack of indigestion.

R. G. Ransom, well known in Salt Lake City automobile circles, has been appointed office manager of the Covey-Ballard Motor Co.

The appointment of William Gamble as purchasing agent for the Rock Island Plow and Tractor Co., Rock Island, Ill., is announced. For 30 years he has been a member of the Moline Plow and Tractor Co. of Moline, Ill., for the past year or two being located at Poughkeepsie, N. Y. He will make his headquarters at Rock Island.

Harry W. Watson, who has been connected with the Firestone Tire & Rubber Co. for six years, has been made manager of the Columbus, (O.) branch.

Announcement of the appointment of C. E. Fifer as factory representative of the Reo Automobile Co., with headquarters in Greensboro, N. C., has been made. He will have charge of the territory embracing all of North Carolina, Virginia, South Carolina and Maryland.

H. L. Munson, formerly with the Buick distributor in Hartford, Conn., has been made sales manager of the Springfield (Mass.) Buick Co. Otto Reikert, formerly of the Buick branch in Chicago, was recently made service manager of the Springfield company.

C. O. Brandes has been appointed export manager of the Erie Tire & Rubber Co., Sandusky, O., with an export office at 5511 Euclid avenue, Cleveland, O. Brandes has been in the tire business since 1907 and for many years was export manager for Firestone.

F. Ed. Spooner has resigned as secretary of the Old Timers Club. No successor has been appointed.

John Bergoyne Foote president and treasurer of Foote Bros. Gear & Machine Co., Chicago, is dead. Foote was a pioneer in making cut steel, case hardened, tough cored gears for heavy duty work. He was one of the first to invent and build enclosed types of transmissions for reducing electric motor speeds. He shared with Henry Ford the honors of pioneering the present light weight type of farm tractor and in this connection he was the inventor of the enclosed transmission and live axle drive.

W. G. Zahrt, vice-president of S. P. Bowser & Co., Fort Wayne, Ind., has resigned.

Maj. Edward H. Conger, who served during the war in the U. S. Transport service, and recently with the Nash Motors Agency of Philadelphia, has gone with the Packard Motor Car Co., of Washington, D. C.

Oakland Output to Be 30 Per Cent Enclosed Cars Next Year

DETROIT, Nov. 7—Thirty per cent of Oakland production in 1923 will be enclosed cars, according to C. J. Nephler, general sales manager. September was the company's biggest month this year due to the introduction of its new models and October production will run higher. The company reports its sport car and two passenger coupe oversold. The sedan and five passenger coupe now are in full production. Full working time is assured for the winter months, he said.

W. R. Tracy, assistant sales manager, back from a trip through the middle west, reports business in industrial centers holding up in good shape, but that farm buying is considerably below normal.

GOOD SALES IN BOSTON

BOSTON, Nov. 4—Boston automobile dealers are reporting that business seems to be keeping up pretty well for this time of year, everything considered. Sales have not slowed down to any appreciable extent. There is a big demand for enclosed cars now, and some of the dealers unable to get such types report they are getting cancellations. Several dealers state that they are getting orders for new cars to be delivered after April 1. This is due to the peculiar tax law in Massachusetts. A man may buy a car after April 1 and not pay any personal property tax upon it for that year. He can sell his old car late in March and go without a car for a few weeks, or until the first week in April, and if he lives in a town that has a high tax rate—some of them run up to $30 or more on the $1,000—he can save enough that way to more than pay his registration fees.

Boston dealers are holding individual enclosed car shows or trying other stunts to keep up interest in sales, with good results.

NEW FACTORY TO MAKE STARS

NEW YORK, Nov. 6—W. C. Durant has ordered the construction of a fifth factory for the manufacture of Star cars. It will be located at Flint, Mich., will have a capacity of 8,000 cars a month and will employ 4,000 men.

The revised Durant schedule calls for the production of 281,000 Star cars between now and Dec. 31, 1924. Between Jan. 1, 1923 and Jan. 1, 1924, 86,000 are to be made at Lansing, 50,000 at Flint, 53,650 at Elizabeth, 43,000 in California and 32,250 at Leaside, the Canadian plant. It is expected that the four plants now in operation will produce 16,000 cars before the first of the year. Up to the present about 4,000 have been built.

NEW STEAM CAR IN CANADA

WINDSOR, Ont., Nov. 5—This city is to have another automobile industry and will enjoy the distinction of being the first city in Canada to turn out steam cars. The name of the new concern is Windsor Steam Motors, temporary offices for which have been opened at 6 London street East. The company is a branch of the Trask Detroit Steamer.

ADDITIONS TO GENERAL TIRE

AKRON, O., Nov. 6—The General Tire & Rubber Co. announces plans for three extensive additions to the factory, upon which work will start at once. Officials say this has been the best year in the company's history and that the tire production capacity the additions will give is needed to take care of the demand.

To Make Lincoln "Finest Car in America," Says Edsel Ford

Makes This Statement in Omaha, on Inspection Trip With Other Factory Officials

OMAHA, Nov. 6—Edsel Ford, president of the Ford Motor Co., was in Omaha last week on an inspection trip. He was accompanied by W. A. Ryan, general sales manager; E. C. Kanzler, production manager, and R. C. Getzinger, sales manager for the Lincoln car.

Speaking of the recent reduction in the Ford lines, Ford said, "Every time we lower prices, we are broadening our field, and giving employment to a greater number of people. It is my aim in life to give as many people employment as possible, and at a good living wage.

"We do intend, and I'll tell you people straight from the shoulder, to make our Lincoln car the finest automobile in America. We are going to spend money to do this."

TEMCO PATENT SUIT DECIDED

COLUMBUS, O., Nov. 5—The United States Circuit Court of Appeals has handed down a decision in the suit of the Temco Electric Motor Co. against the K. W. Ignition Co. of Cleveland for infringement of the Thompson patent relating to shock absorbers for Ford automobiles. The case had been appealed from the District Court of the United States for the Northern District of Ohio whose decision was reversed. The decision carried with it a recovery of nearly $300,000. Toulmin & Toulmin of Dayton, O., who represented Temco in the suit, state that 25 or 30 other concerns are also involved in this decision and that some of them already have settled without suit.

JACKSONVILLE "FORD DAY"

JACKSONVILLE, Ill., Nov. 5—In cooperation with the other merchants of Jacksonville, the automotive dealers association has been active in promoting Ford day, set for Tuesday, Oct. 31. The automobile dealers contributed one-third of the total expense necessary in advertising, prizes and other items. Two hundred prizes will be given away. Band music, a street dance, mardi gras with prizes for the best costumes displayed by masqueraders, and other amusement events will attract a large crowd. A free auction sale of used cars will be a unique feature. Anyone owning a car, who wishes to get rid of it so that he can purchase a new one, will have an opportunity. The dealers' association will furnish an auctioneer and clerk free and there will be no fees attached to the sale. The owner gets the total amount of the sale. While the original idea of the celebration was a Ford day, yet all makes of cars will be welcomed and it will be "Automobile" day, rather than exclusively Ford.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Correct Method of Burning in Ford Bearings

Q—Give instructions for burning in Ford crankshaft and connecting rod bearings.—Mission Garage, Hermitage, Ark.

Before the burning process is started the bearings should be given a rough preliminary fit in the upper half of the case. The burning should not be started until it is seen that the crankshaft bears on each of the three main bearings, which can be determined by looking at the impression left by the Prussian blue or lampblack. Assuming that the upper half case bearings are in alignment, the next step is to file the edges of the babbitt in the case bearing with a flat rasp or file to an angle of about 45 degs. from the horizontal.

The groove thus formed, when the cap is assembled, acts as an oil lead for the bearing and also as a clearance to take care of the babbitt pressed out during the subsequent running in and burning then the crankshaft is fitted in the case. The crankshaft end play is determined by the variation between length of the rear bearing and should not be more than .004 of an inch. Note that expansion in length of crankshaft due to heat in operating engine is forward from the rear or long bearings. Any rearward movement would effect the gap between coils and magnets. The center and front bearings should have from 1/32 to 1/16 of an inch end clearance to allow for expansion and lubrication. The oil grooves of the caps are filed and the caps are placed over the shaft using the marks which were previously punched or stenciled on them to determine their correct location.

The cap is now rocked over the shaft and two or more shims of .002 thickness are applied until the rock of the cap shows a .004 or .005 clearance between case and cap edges. The caps are then bolted down and the bearings are run in on a belting block at a speed of about 200 r.p.m. for the period of one minute. The bearings during this process are pressed to conform to the shaft and at the end of one minute's run each of the main bearings should be smoking hot and of such temperature that the hand cannot be placed on them without burning.

If all caps show about the same amount of heating the caps are removed and examined to see whether the bearing surface covers over 75 per cent of the total area of the cap.

If some of the bearings are not making the required amount of surface contact the operation should be repeated. Providing all bearings have a proper amount of contact surface, it is advisable to give them a running in of about 20 minutes, using about the same tension as is used in the burning-in process. Oil is placed on the crankshaft and on the bearing halves before the running-in process.

The same method is used in burning-in the connecting rod bearings. It should be remembered that before burning in that the connecting rod caps and the main bearing caps should have a rock of about .004, that is, they should not touch the lower half of the connecting rods nor should the main bearing caps touch the upper crankcase, a distance of .004 should separate them.

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

Readers' names will not be published with articles, if a request to this effect is received with the letter. The name and address should be given, however, so that we can send a copy of our answer direct by letter. This saves waiting for the answer to be published, which sometimes occurs several weeks later, depending upon the space available.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

Legal Regulations of Dealers' Licenses

Q—Advise if in this state dealer's license can be used on other cars than demonstrators and penalties for abuse of same. If in Pennsylvania a garage owner is compelled to keep a record or register of all cars stored in his garage, penalties for neglect and if any special form of register is required, if so where obtained. —"X," Uniontown, Pa.

A—In Pennsylvania the dealers' license plates are issued solely for the purpose of testing, demonstrating, or selling automobiles. The law says: "No person or persons shall use or permit the use of plates issued under a dealer's registration on any motor vehicle other than those owned by such dealer and operated by such dealer or his employes, or for any purpose other than demonstrating said vehicle to a prospective purchaser, or testing, or removing same from storage place, shipping point, or in place of delivery, before or after sale." Section 970, Automobiles. Penn. Statutes 1920.

For an abuse or violation of this provision section 984 declares one to be "deemed guilty of a misdemeanor, and, a conviction thereof, shall be sentenced to pay a fine of not exceeding one hundred dollars, or to undergo an imprisonment not exceeding thirty days, or both or either, in the discretion of the court."

Yes, the garage owner and, also, every motor vehicle repair shop in Pennsylvania are required to keep a record "of the names of any and all persons owning, or having charge of, any motor vehicle stored, left for repair, or any other purpose, together with the make, name of the state of registration, manufacturer's number, and the registration number of such motor vehicles. Such record shall be kept in ink or indelible pencil, and shall be open to the inspection of police officers or other proper authorities. Such records shall be retained and be available for a period of one year after entry, but not thereafter. He shall also notify immediately the local police authorities and the State Highway Commissioner of any such motor vehicle whereon the manufacturer's number or mark has apparently been altered, obliterated, or removed."

The law provides that the Highway Commission shall prescribe the manner of keeping this record, therefore if he has prescribed a form you may obtain same from his office. The penalty for neglect in keeping such a record is the same as the one stated above.

Cylinder Grinding Shop

Q—I am now starting to build a garage building and I come to you for some information, as I desire the best that can be made from the lot. I am in the cylinder and crankshaft grinding business and handle piston rings and wrist pins wholesale and retail and do a large repair and rebuilding business and I have a completely equipped shop from the blacksmith shop to the finishing of the rebuilding of cars and trucks. I have a Heald and a Landis grinder, too lathes, two drill presses, a milling machine, an arbor press and a score filling outfit. I want you to give me the best layout for this equipment, in this building, that you can.

You will find enclosed a rough sketch of the floor plan of the building. This is to be a one-story building, two stories in front for the office and toilets and ladies' restroom. I will appreciate it if you will give me a full set of drawings of this building so I can give it to my architect.—P. B. Comer, Greensboro, N. C.

We believe it would be a good policy to separate the general garage business from the cylinder and crankshaft business in so far as is possible under one roof.

Grinding business from the general repair shop would be taken into the grinding shop under the same conditions that business would be taken from outside trade. Jobs would be received in the small stock room and taken out and put into work as needed making the round of the different operations and going to the shop, to the outside customer or other destination when finished.

If your rebuilding includes body work the space could be taken from this shop or from the garage space. The latter would be preferable though it would cut down car capacity materially.

Rather than clutter up the grinding shop with battery and electrical work, we suggest that this be done on the second floor. A small electric elevator or dumb waiter would move the work up and down with speed and no effort.

You have made no mention of stock rooms but undoubtedly you will need them for parts and accessories also. A general stock could be carried on the second floor with small special supplies in the various departments.

Architectural Service

For several years MOTOR AGE has supplied an individual architectural advisory service to all of those who requested the assistance of this publication in building problems. This service has grown to such an extent that a special pamphlet, "Building Suggestions for Automotive Dealers," has been published by MOTOR AGE and is sent to automotive dealers on request.

If you have building problems before you we would suggest that you provide yourself with a copy of this pamphlet and see if it does not answer your questions. If, after reading this pamphlet, you still have questions, ask them.

ADJUSTMENT OF OVERLAND GENERATORS

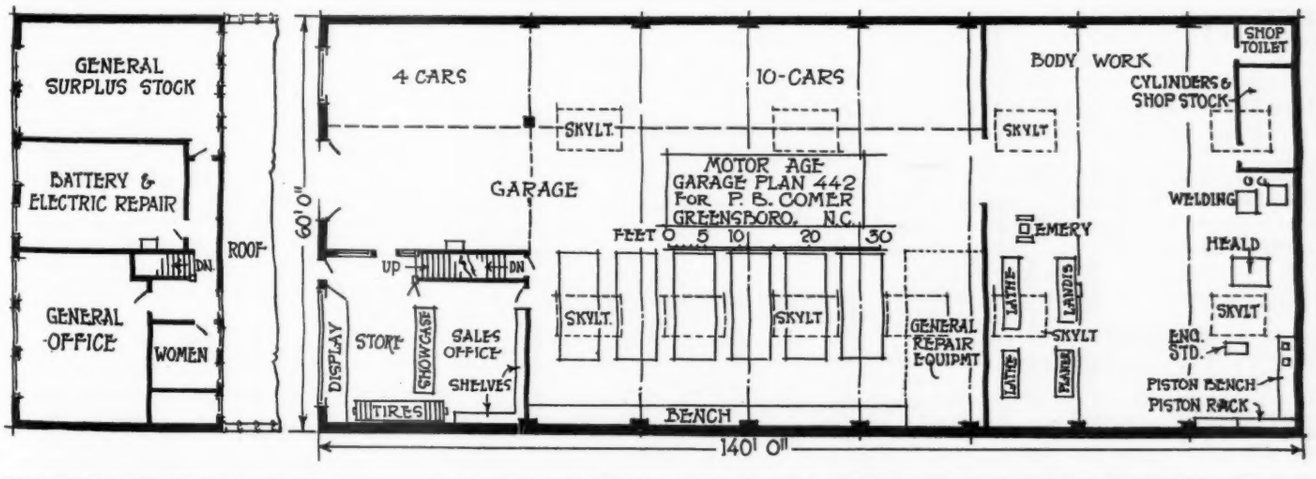
Q—We would like a little information in regard to the generator on the Overland Four. We have had quite a lot of experience with them and have had good success in making repairs, with a few exceptions.

In receiving a carload shipment of these cars we find that the generators on about half of them will not cut in at nearly so low a speed as on the others. They will, however, generate any desired amount at medium speed. Some of these will not cut in under 15 or 18 m.p.h. and any adjustment on either main brushes, third brush or cutout does not seem to help. Once in a while we notice this characteristic showing up in overhauled generators, and while everything tests as it should, the only remedy that we have found is an entire new generator.—P. M. Elliott, Kingsville, Texas.

One possible cause of the trouble is in a cutout in which the spring is too stiff or the air gap too great, so that while the generator does its part and generates a voltage, the cutout contacts do not close until at rather high speed. This condition can be easily detected, however, by slowly increasing the speed of the car and watching the ammeter. If the charging current jumps suddenly to five or six amperes it shows the fault is in the cutout, but if the charging current starts at one or 1½ amperes it shows the fault is not in the cutout but in the generator.

Inasmuch as some of the generators are satisfactory, it shows the fault is not in the design, and one possibility is that the air gap is too great in those which cut in at high speed. We would accordingly suggest your using micrometers to get the diameter of armatures, both where operation is poor and where it is good, and you can check the bore between pole pieces by using the armature and thickness gages to check the air gap. We would also suggest comparing the field current on generators that cut in late.

Would also suggest trading armatures between machines that operate O. K. and those that do not. Would also suggest checking armatures by sending current through them by making connection at the brush positions. The armature can then be set on end and a compass moved around the armature to locate the strongest magnetic pole. It may be found that this location of the strong magnetic pole with respect to the points of contact on the commutator varies in different armatures, showing variation in the winding pitch. We admit that this trouble is a mean one to locate, but believe that if you try swapping parts between good and bad generators that you will eventually locate the cause of this condition.



Architectural Service

IN giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.

Proper Way to Align Wheels

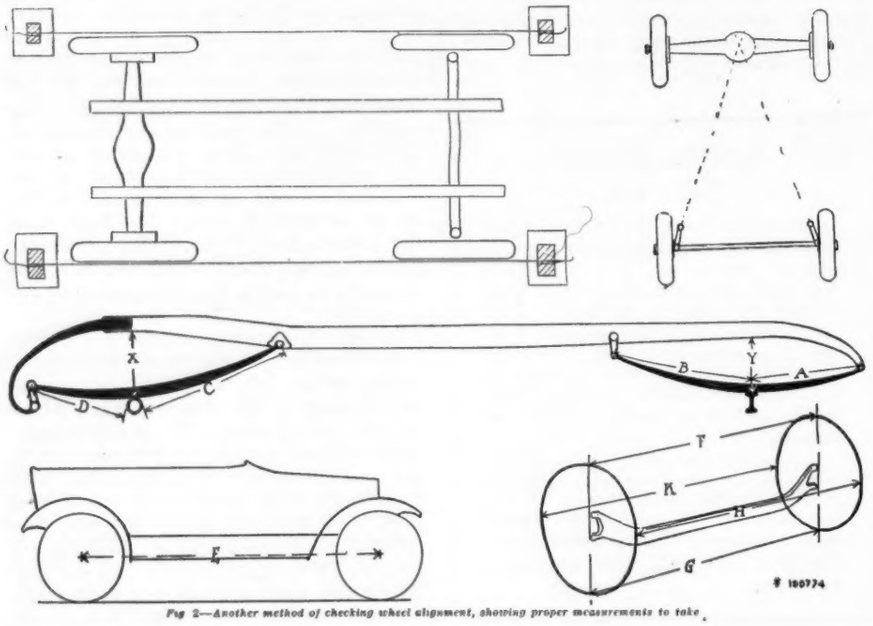


Fig 2—Another method of checking wheel alignment, showing proper measurements to take

Q—Question has arisen as to the proper way to align wheels. We use a Duby wheel gage, which some claim is not accurate. Advise the proper way to do this and also the method of aligning wheels by the use of a string and how far from the center of the front wheel should these lines meet?—Sam's Repair Shop, Provincetown, Mass.

1—The Duby wheel gage as far as we are able to learn is considered accurate and can be depended upon to give accurate results when aligning. However, often times a distortion of the frame or slippage of the front or rear axle may cause misalignment which may not be corrected by the use of the wheel gage. Where a car is showing excessive wear on one of the front tires or where it does not steer correctly even after the front wheels have been aligned, it is advisable to check on some other points in addition to the wheels to determine whether the front or rear axles have their proper relation to each other.

The first thing to do is to measure the distance from center to center of the extremities of each axle as shown in figure A with wheels in straight ahead position. The distance E must be the same on both sides of the car. If semi-elliptic springs are used, measure the distance from the center of axle to point of shackling, as shown in figure C. To check camber and "toe in", make the measurements as shown in figure B. In determining the amount of "toe in", the distances should be taken from centers to center of the tires at front and rear. Measured at the height of the spindle.

The distance H figure B, should not be greater than the distance K and should not be more than ¾ inch less. In other words, the front wheels should toe in from 3/16 to ¾ of an inch at front. There should be that much more distance between the felloes in the back. After alignment of the wheels has been made, and when the front wheels have been checked for camber, set the wheels so that they are pointing straight ahead. A straight edge or string then should be used to check from the front wheels to the rear wheels on each side as shown in figure D, this is just a re-checking and it will prove whether the frame and axles are in alignment. Further check should be made of the spindle arms by reference to Fig. 3, page 50, of the Nov. 2 issue of MOTOR AGE.

AS TO OIL AND OIL PUMPING

Q—Is there a pure paraffine base oil on the market, and if so, who manufactures it?

1—We have no information available as to the exact character of the crude oil used by the various oil companies. According to *"Economics of Petroleum,"* a book by Joseph E. Pogue, which is published by John Wiley & Sons, New York, the source of petroleum base oil is chiefly the state of Pennsylvania. We can accordingly assume therefore that any concern obtaining its crude oil from Pennsylvania will develop a paraffine base product.

2—Will the piston of an automobile engine pump more oil when its valves are sticking? We feel that it will not only show more oil on account of poor combustion, but will actually pass more oil by the piston rings, due to lack of pressure above the piston.

2—Your reasoning appears logical and excess oil pumping would doubtless occur both due to lack of pressure and lack of combustion which would consume more or less of the oil which reaches the combustion chamber.

3—Will an automobile engine pump more oil when it is being driven by the car, with the throttle closed and ignition on, as in going down a hill or when running under its own power a pulling a heavy load?

3—If the reasoning of question two is correct, the oil pumping would be the greatest under the light load, as when running down a hill, as under these circumstances there is less explosion pressure above the pistons.

4—Which do you consider the best oil for automobile engine lubrication, paraffine base oil or asphalt base oil?—H. S. Brown, Los Angeles, Calif.

4—This is a matter on which there seems to be a great deal of difference of opinion. We will accordingly quote from page 169 of *"Economics of Petroleum,"* the book previously mentioned. The quotation is as follows: "The public and privately expressed opinions of the leading petroleum chemists in the country, however , are practically unanimous in asserting that for all purposes other than steam cylinder lubrication the lubricating oils made from asphaltic crudes are inherently as serviceable as those made from paraffine crudes." It would accordingly appear that either type of oil is satisfactory and we would give as our opinion that the process of production might have as much or more to do with the satisfactory quality of the oil as the base from which it is made.

WISCONSIN FIRE LAWS

Q—Have seen a couple garage and repair shop plans in your last couple issues and therefore, am giving you a question about building a repair shop. Is there any law in Wisconsin that repair shops must be fireproof? This place is not located in a city and no buildings nearer than 500 ft. Please answer this question as soon as possible.—A Reader, Luxemburg, Wis.

Ordinarily there are not legal restrictions on buildings outside of certain designated fire limits of a city or municipal corporation. Wisconsin has no statute applying generally and covering such a location as you describe. Therefore, you may proceed to build without regard to legal restrictions.

However, you will find that the better you build, as regards possible fire loss or otherwise, the better insurance rates you will be able to obtain from the insurance companies. Also you may consider this angle: Should other building be done about you and the city fire limits extended to include your place, you might be required by the proper officials, backed up by a court injunction, to make your garage fireproof.

BUICK VALVE CAGE TOOL

In the September 21st issue of MOTOR AGE there was a Clearing House article discussing methods of removing Buick valve cages and it was stated that there was no tool on the market for doing this, a home-made method being given. We are advised by one of our subscribers, the Rubio Motor Co., of Rubio, Iowa, that there is such a tool, which can be obtained for approximately $3 from Back & Corbitt Iron Co., St. Louis, Mo., this tool being manufactured by the Buffum Tool Co.

Theory of the Planetary Gearset

Q—We are having an argument on a Ford transmission and would like to get an answer yes or no, if it is the difference in the number of teeth in the planetary gears that reverses or not. If not too much trouble, answer in next issue and explain.—Meyers Garage, Tigard, Oregon.

An Explanation of the Ford Transmission Action

1—Illustration of Ford transmission construction is shown below. To understand the action of the transmission in low speed and in reverse it is necessary to know its construction. The brake drum is fastened to the end of a long sleeve which revolves freely upon the transmission shaft. Then we have a low speed drum fastened to a shorter sleeve which slips over the brake drum sleeve and turns freely upon it. The front of the slow speed drum sleeve has 21 teeth cut into its surface forming the central slow speed gear.

The reverse drum is fastened to a still shorter sleeve which forms the central reverse gear, having 30 teeth on its outer surface. This revolves freely upon the slow speed drum sleeve. Each sleeve is bushed to fit the next sleeve. Each drum and sleeve turns independently and the brake drum sleeve turns freely on the transmission shaft. A 27-tooth spur gear is keyed onto the front end of the brake drum sleeve just ahead of the slow speed gear. This is the driven gear and turns with the brake drum and, consequently, with the drive shaft.

When the clutch is free the speed of the car depends on the speed of this gear. Mounted upon three studs pinned into the webb of the flywheel 120 degrees apart, are three sets of planetary spur gears, each set having three gears. The drive gear has 27 teeth and meshes with the 27-tooth central driven gear. The next gear has 33 teeth and meshes with the 21-tooth central slow speed gear. The rear one has 24 teeth and meshes with the 30-tooth central reverse gear.

The Operation in Reverse

The reverse drum is held stationary by a band around it. The 30-tooth central reverse gear being riveted to the reverse drum is also held stationary. The 24-tooth planetary reverse gear rolls around 30-tooth gear being pulled by the pin in the flywheel. In going around the 30-tooth once (one turn of the flywheel) the 24-tooth gear makes 30/24 or 1¼ revolutions to the left on each pin. The drive gear being riveted to the 24-tooth gear also makes 1¼ revolutions to the left on the pin. The excess ¼ revolution of the drive gear (to the left) will turn the driven gear one-fourth turn to the right for one revolution of the flywheel or one turn to the right for four turns of the flywheel, giving a gear ratio of 4 to 1 in reverse.

Low Speed Operation

The slow speed drum is held stationary by a band holding the 21-tooth central gear stationary. The 33-tooth planetary slow speed gear is pulled around the 21-tooth gear making 21/33 revolutions to the left on its pin causing the drive gear to make 12/33 revolutions to the left. The drive gear must turn one whole revolution to avoid turning the driven gear, therefore, the driven gear will be dragged the difference between 21/33 and 33/33 which is 12/33 revolutions to the left (ahead) and for one turn of the flywheel, giving a ratio of 2¾ to 1 in low speed.

We believe that a study of the explanation given will show that a direct answer to your question is "Yes," for it is the selection of proper tooth ratios in the different spur gears, commonly known as triple gears, that determines whether you get forward or reverse and how much of either.

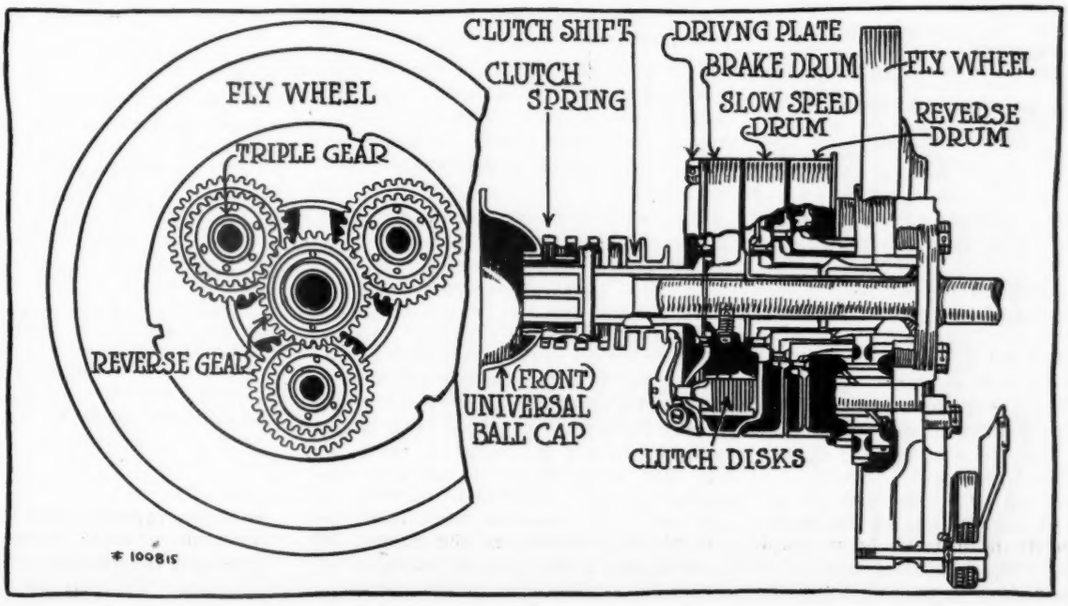
UNEVEN COMPRESSION A LIKELY CAUSE OF ENGINE KNOCK

Q—We have an old G. A. White taxi converted into a truck for service work. The original block was cracked so we installed a new one. Now we haven't the power which the engine should develop and the engin knocks under a load. Have ground the valves very carefully and the pistons are aligned perfectly. The timing is correct according to the flywheel markings. The knock is not a rod or main bearing knock but is a dull thud more than a sharp rap. Advise us where the trouble exists.—John Monroe, Allentown, Pa.

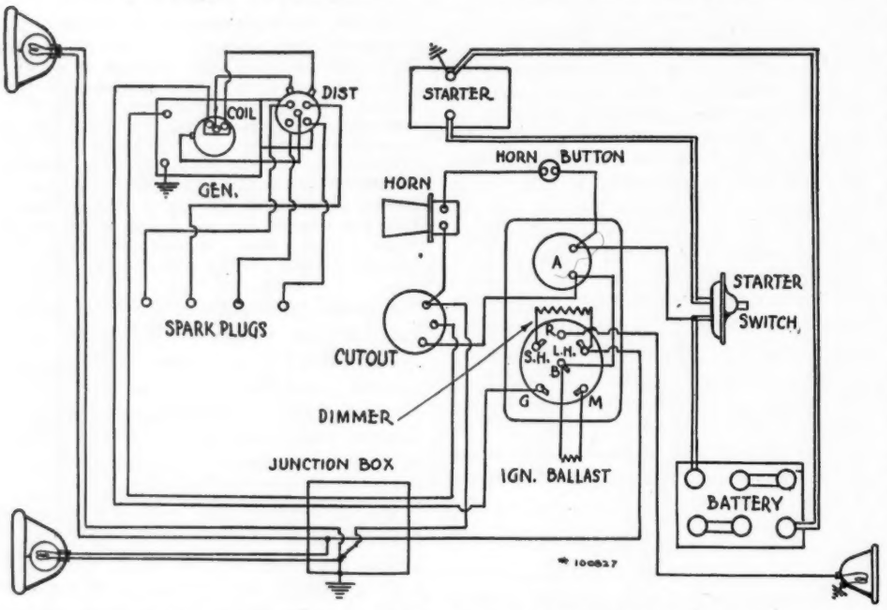
1—Your description of the noise occurring in this engine is indicative of a knock caused from uneven compression. Uneven compression in this engine can be caused by a defective casting or a casting which has only a portion of the cores and removed from the inlet passages in the cylinder casting.

Would suggest that you remove carbureter inlet header and carefully examine the block with a small flashlight bulb connected to a dry cell or to a flashlight battery, which will enable you to explore the full extent of the inlet passages from the outside of the block to each of the four cylinders. Remove all cores and obstructions or any other foreign particles that may be restricting the passage of the gas. Also examine inlet manifolds for possible air leaks. Be sure that carbureter has as rich a mixture as it will stand without loading and, if possible, put a compression gage on each cylinder to note the average compression of each.

Another possibility presents itself, and that is a clogged muffler. To test for a clogged muffler it is only necessary to remove it from the exhaust pipe and operate without the muffler connected. The uneven compression theory, we believe, is the most likely, and would suggest that you concentrate your efforts on this as the first step toward tracing down the cause of the knock.



Using an Oakland Switch on Chevrolet



Q—We would like to have a sketch showing in detail how to connect an Oakland switch, such as we show in the enclosed sketch, on a 1913 model 490 Chevrolet, which has wiring arrangement like the diagram on page 43 of the September 26, 1922, issue of MOTOR AGE.

Will it be necessary to use a separate resistance coil for dimming the head lights? Since the Oakland switch is designed for magneto ignition we would appreciate being advised how this can be arranged to work in place of the Connecticut switch.—Ralph N. Bell, Care Midwest Engine Co., Anderson, Ind.

A diagram is shown herewith incorporating the lighting switch and ammeter from the Oakland car, used in place of the standard Connecticut switch as used on Chevrolet cars.

There are three complications, which however, are not unsurmountable. One is as you suggest in the necessity of making a dimmer for the headlamps, this being connected between the terminals marked S-Head and L-Head. It will also be necessary to make up another resistance to act as an ignition ballast to hold the primary current to about 5 amperes when the interrupter points are closed and the current is flowing to the coil. In both cases you will have to experiment with the amount of iron or German silver wire in order to get the right resistance. German silver wire would be more suitable for the dimmer and iron wire for the ballast.

The third complication is that the switch designed for use with a magneto makes the connection from the magneto to ground terminal in the off position, whereas battery ignition requires a connection in the on position. This means that if you use this standard switch you have to turn the key to the off position in order to run and will have to put the key in and turn it to the on position and probably leave it there in order to keep battery current from flowing through the ignition coil when the car is standing. It is possible that you might take the switch apart and change the brass fingers which make contact with the magneto and ground, so that they will operate the reverse from what they do now but it will depend on your own ingenuity and ability, whether you can doctor up this switch successfully.

DASH CLOCK WON'T RUN ON ONE CAR, O. K. ON OTHERS

Q—We have a very good Waltham auto clock that we have tried to install on a Cleveland coupe, but for some reason or other when we put it on the dash it will not run more than 10 minutes, no matter whether the car is standing or running. The dash is wood, covered with heavy sheet iron. We have put the clock on with several kinds of washers, so that the clock would not touch the metal, also from behind, so that it was against the wood, but still it would not run. While the clock is away from the dash it never stops.

We have also tried it on a Buick and a Lexington car and it operates on either one of them. The only thing we can figure is that the Cleveland car, having a Bosch magneto about 2½ feet from the clock, has a detrimental action on the clock's movement. Can you tell us what the trouble is?—Zinser Bros. & Co., Joliet, Ill.

We do not believe that the magneto has anything to do with the trouble experienced with the clock, as the distance is too great and the magnetism has its own path inside of the magneto, which, being a very good path, prevents any appreciable magnetic leak. We believe that the answer is in a condition of magnetism in the main spring or hair spring in the clock itself combined with the presence of the iron on the cowl board. We would accordingly suggest having the clock checked up by a local jeweler or sending it to the authorized Waltham agents in Chicago, the Arthur Jones Electric Company, 2925 Calumet Avenue.

Inasmuch as there is no such thing as a magnetic insulator, the use of washers under the rim of the clock had no other effect than to slightly space the clock with regard to the sheet metal of the cowl board. If you care to experiment with the clock in regard to its magnetic condition, you can do so with a compass, first making sure that you get away from other machinery which may have magnetic qualities. Then if there seems to be a magnetic conditions which attracts the compass, or even if you are not sure of it, it will do no harm to try a simple demagnetizing process. One way is to use an ordinary growler as used for armature testing and take the clock and hang it on a string so that it can be twisted to revolve rapidly in the alternating magnetic field produced by the growler.

Then with the clock spinning around in the space ordinarily occupied by the armature and with the current flowing through the growler, gradually draw the clock upward and out of the magnetic field. The theory is that the springs will be reversed in their magnetism very rapidly and that the magnetic condition will be gradually weakened as the clock is withdrawn from the zone of greatest strength. When the clock is three or four feet away from the growler the magnetism will have been reduced to practically zero, at least this is the theory on which this demagnetizing remedy is based, and in the case of watches we have seen considerable benefit obtained.

G. M. C. SUPPLIES PARTS FOR SHERIDAN

Q—Give the following information concerning the 1921 Sheridan car. Are they an assembled car?

1—The Sheridan was an assembled car, but the Olds Motor Works is handling the service for this concern on an equal status with their own and can furnish all such parts as steering gear, front axle, engine, clutch, transmission, rear axle and universal point.

2—If so, what are the makes of the different units used, such as steering gear, front axle, engine, clutch, transmission, rear axle

2—The units that comprise the Sheridan car were manufactured by the various G. M. C. subsidiaries. The car included a Northway engine, Muncie transmission and Warner steering gear. The other units were manufactured by various other General Motors plants located in different parts of the United States.

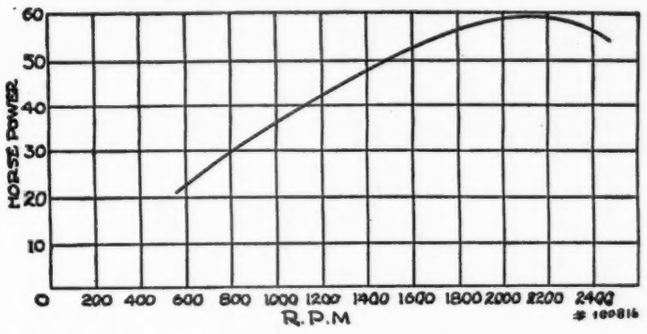
3—I understand the Sheridan is an orphan car; if so, is it possible to obtain repair parts for these cars, and where?

3—As stated in the first question, repair parts for this car can be obtained from the Olds Motor Works.

4—What is the gear ratio of the differential? And are the propulsion and torque taken by the springs?—Edw. H. Stolz, Meadville, Pa.

4—The torque on this particular car in question is taken up by means of a torque tube, the final drive being through the springs. The gear ratio is 4 2/3 to 1.

Power Curves



Q—Show power curve of the Buick Six, Lexington and Studebaker Big Six.—E. J. Sears, Paducah, Ky.

Power curve of the Lexington appeared in September 14, 1922, issue of MOTOR AGE on page 47. The power curve of the Studebaker Big Six is not available nor is the power curve of the 1922 Buick Six. The power curve of the 1920 Buick Six is shown in the figure above.

VALVE TIMING TO SECURE SPEED

Q—Give valve timing, that is, the opening and closing of inlet and exhaust valves best suited for racing, exclusively, on a 1920 Buick Six engine. We want to step-up the engine as fast as possible and we are therefore making a special camshaft and want your ideas as to the proper valve angle in degrees.

1—The most efficient valve timing angle for high speed performance is arrived at only by experimentation. However, we are submitting a typical timing diagram of a 3000-r.p.m. engine; exhaust opens 50 degs. ahead of bottom dead center, exhaust closes 10 degs. past top dead center, inlet opens 15 degs. past top dead center, inlet closes 45 degs. past bottom dead center. This is a typical diagram and would not necessarily give the best results on this engine.

One factor that has considerable to do with high-speed is delaying the closing of the inlet valve as long as possible. We might state that on some high-speed engines the inlet closes at as much as 70 degs. past bottom dead center. We would suggest that you take up the construction of this camshaft with the manufacturers of camshafts the names of which will be supplied you by letter. These firms have well equipped laboratories and would be able to supply you with very definite information concerning the shaft best suited for the work to which you refer.

2—Give valve timing in degrees of the 3400 r.p.m. Chalmers engine.

2—The following is the valve timing of the model 32-B Chalmers which carries high-speed 3400-r.p.m. engine: Inlet opens 5 degs. late, inlet closes 45 degs. late, exhaust opens 45 degs. early, exhaust closes 15 degs. late.

3—What is meant by overlapping valves?

3—Overlapping valves are valves wherein two of the valves, that is, both inlet and exhaust valves, are open at the same time. On the 32-B Chalmers the valves are said to be overlapping because the inlet valve opens 5 degs. after upper dead center while the exhaust valve does not close until 15 degs. after upper dead center. In other words, overlapping valves in this case are valves so timed that the inlet opens before the exhaust valve has closed.

4—Where can we secure a set of the Richards cams?—Roy Humphrey, care Keokuk Buick Co., Keokuk, Iowa.

4—We regret to state that we have never heard of a Richards cam, and if you will explain fully just what you refer to. We perhaps shall be able to offer further information.

CARBURETER FOR BUICK D-45

Q—We have a model D 45 Buick 6 touring car and would like to know whether any other carbureter besides the Marvel could be used to give better results. The car comes equipped with this type carbureter, but we thought that possibly some other make would improve the operation of the engine.—W. G. Miller, La Salle, Mich.

Carbureters installed as regular equipment on motor cars are usually selected after careful test by the engineering department, and we accordingly believe that the Marvel carbureter as used on this model D-45 Buick will be as satisfactory as any other type.

As originally installed, it was equipped with a hot-spot, taking exhaust gas from the manifold and passing it through the carbureter passages in order to heat the carbureter. As this is in accord with present-day practice, you should get good results, and if this is not the case, would suggest your getting in touch with the nearest Buick service station or in touch with a Marvel carbureter station if you have opportunity to do so, as some small adjustment may be necessary in order to give best results.

Latest type Marvel carbureters used on Buick cars have hot-spot through which the flow of hot exhaust gas is controlled by the throttle opening. When idling, all of the exhaust is run through the carbureter heater, while as the engine speed increases the change in throttle opening also operates a valve which diverts more and more of the exhaust gas away from the carbureter to prevent excessive heating. If you are interested in an improvement of this carbureter, we would accordingly suggest your taking the matter up with a Buick service station and arrange for securing the new type hot-spot.

CHANGING GENERATOR ON MAXWELL

Q—We wish to replace a Sims Huff motor generator, 6-12 volt type, with a straight 12-volt motor generator. The old type was used in 1917 and the type that we wish to put on was used in 1918 and early 1919. Both types haxe six brushes and voltage regulators, the only difference being that the original one used a 12-volt battery split in two sections which were connected in parallel when operating as a generator, so that as a generator this machine operates on six volts, while the one we wish to install operates on 12 volts. What change will be necessary other than in the battery? Will it be necessary to have a different panel board or will the old one work?—John A. Wakefield, Cowden, Ill.

1—For consideration of the problem of changing generators as above indicated it will be well to refer to the diagram of the 1916 and 17 Maxwell as shown on page ?? of the ——— issue of MOTOR AGE. Also to page 45 of the August 24 issue of MOTOR AGE, which shows the motor generator that is to be installed. It is not absolutely necessary to install a new battery if the old one is O. K., as it can be made into a straight 12-volt battery by making a permanent heavy cable connection from the No. 12 positive post to the No. 13 negative post and then using the No. 10 positive post as the live terminal of the whole battery.

Negative Posts Grounded

The other negative posts will remain grounded as before. One change that will be required will be in the voltage of the lamps, as these will now operate on 12 volts instead of 6, so that new bulbs will be required. On the panel board the things which require a change are the shunt winding of the combination cutout and regulator and the resistance which is connected across the regular points. It would be possible to make up a coil of silver wire resistance equal to the resistance of the shunt winding and connected in series with the No. 9 wire to ground, which can now be permanently grounded instead of by the action of starting switch.

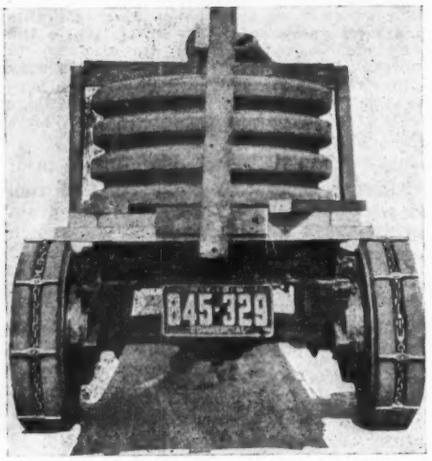
If the resistance across the regulator contact is still used, it will be found that regulation increases at a certain speed; in other words, the charging current will come up with that engine speed and then remain constant for a while, and at higher speed starts to rise again, which may or may not be detrimental, depending on the extent to which the car is operated at the higher speed.

Install Other Panel

The best thing to do, of course, would be to install the other panel if one is available, but if not, it would be possible for a good electrical man to jump a special resistance, or perhaps the resistance only could be purchased and installed on the old panel. In experimenting with a German silver wire resistance, it would be well to start with about number 30 wire and wind up perhaps 12 or 15 ft. of it as a first guess. This can then be connected in series with the shunt winding of the cutout and these two units in series connected across a battery.

The ACCESSORY SHOW CASE

New Sources of Retail Profit

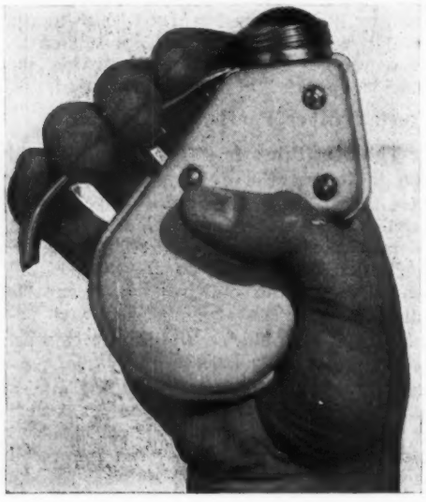


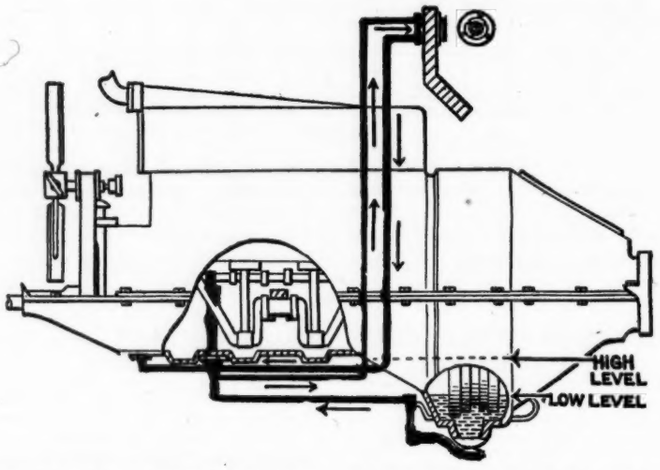
HOLMES DUAL TIRE GRIP

The Holmes Dual Tire Grip is a non-skidding, non-slipping device for truck tires and is made by the Holmes Grip Co., Shelton, Conn. The new link is made from a drop forging with two ears projecting into the cross link, making it impossible for the chains to pull out. The cut shows the application. Prices from $37 to $46, depending upon tonnage.

POWERLITE FLASHLIGHT

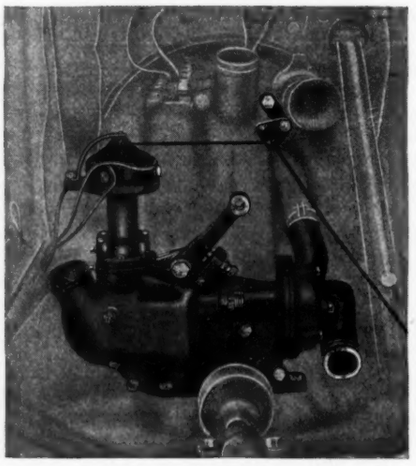
The Powerlite Flashlight is designed to operate without a battery. This objective is attained by using a small electrical generator contained in the body of the supporting case, which case is made to fit the hand. Grasping the case with the fingers operates a lever or trigger which is so arranged that it runs the generator; more or less frequent motion, imparted to the generator by means of the trigger, serving to keep the light burning. Powerlite Co., Cleveland.





H. & L. SIGHT FEED OILING SYSTEM FOR FORDS

With this system the oil is pumped from the reservoir of the crank case, through a pipe to a gage on the dash of the car. After circulating through the spinner, it is forced through a pipe to the front cylinder of the motor and from there it oils all the cylinders in order, returning to the reservoir. There are several check valves in the pipe to prevent the oil from draining out of the motor when the car is not in motion. H. & L. Machine Works, Landisville, Pa.



THREE-IN-ONE IGNITION, OILING AND WATER SYSTEM FOR FORDS

Manufactured by the Hexagon Specialty Mfg. Co., 3631 S. Grand Avenue, St. Louis, this system is intended to improve the ignition, water and oiling parts of the Ford by placing the timer in an accessible position as shown, out of oil and grease. The gear driven water pump, an improvement for the water system, forces a positive flow of water through the cooling system. A gear type force feed oil pump is also included in the Three-In-One and keeps the oil in circulation. It does not interfere with the operation of the generator. The price of the outfit is $31.

LITTLE GIANT FIRE EXTINGUISHER

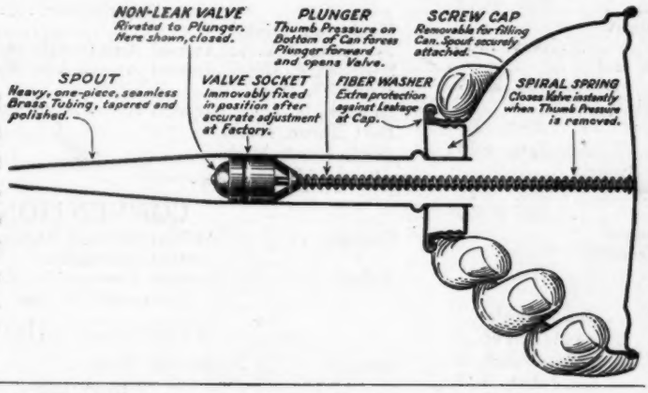
The glass container shown here is only partially filled with the extinguishing liquid and the air is exhausted from the balance of space, leaving the liquid under less than atmospheric pressure. When the container is thrown on the flame, the explosion which follows causes the liquid to be spread to every part of the blaze. The liquid is the same as used by fire departments in small emergency cans. Three sizes are made, one, the Universal, at $1; another, the Industrial, at $1.50. The third size for use in the automobile is $1.25. Wall brackets are furnished with each one. Red-Cup Lubricator Co., 1603 S. Michigan Avenue, Chicago.

SERVICE EQUIPMENT

Aids for Time Saving & Accuracy

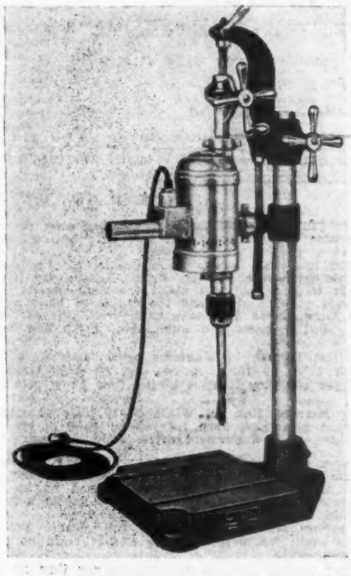
O-NO-DRIP OIL CAN

The operation of O-NO-Drip Oil Can is described in this drawing. It is manufactured by the Arthur S. Harding Co., 100 Boylston Street, Boston, Mass., to sell at 50 cents.


NON-LEAK VALVE
Riveted to Plunger. Here shown, closed.
PLUNGER
Thumb Pressure on Bottom of Can forces Plunger forward and opens Valve.
SCREW CAP
Removable for filling Can. Spout securely attached.
SPOUT
Heavy, one-piece, seamless Brass Tubing, tapered and polished.
VALVE SOCKET
Immovably fixed in position after accurate adjustment at Factory.
FIBER WASHER
Extra protection against Leakage at Cap.
SPIRAL SPRING
Closes Valve instantly when Thumb Pressure is removed.

WAY PORTABLE ELECTRIC DRILLS

A. F. Way Co., Inc., Hartford, Conn., announces a portable electric drill, the features of which are an aluminum housing, finished inside and out, ventilating inlet holes, standard make switch, a 15-ft. cable, rubber reinforced, an armored socket plug, a breast plate and spade handle. The motor is built by the General Electric Co. The cut shows the drill with screw feed attachment mounted on drill stand.

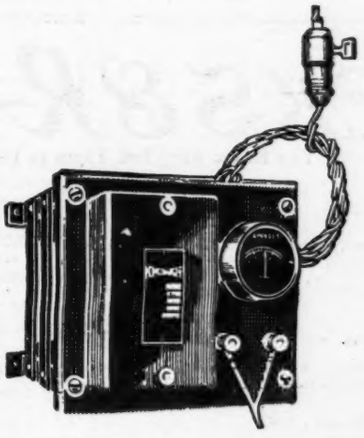


MAJIC HAND PROTECTOR

A compound for keeping the hands soft and white and proofing them against acid burns. Price per half pound can, $.24. Battery Equipment & Supply Co., 1458 S. Michigan Avenue, Chicago.

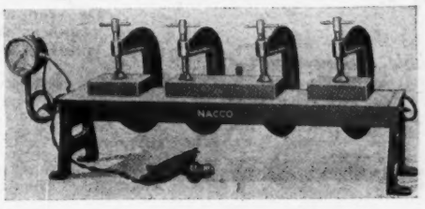
RADIO HOMECHARGER DE LUXE

The Automatic Electrical Devices Co., 122 W. Third street, Cincinnati, O., produces this charger which they claim can be operated at a cost of less than one-third of a cent an hour. Price, $18.50.



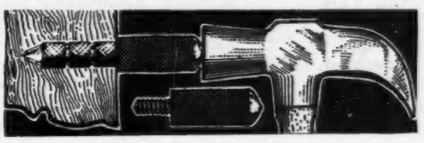
NACCO STEAM VULCANIZERS

Nacco Steam Vulcanizers are the product of the Newsom Automatic Controller Co., St. Louis, Mo., and the automatic controller is one of the features of the machines. The controller gage is set at the factory to cut the current at 55 pounds of steam. In case this device has become altered, a fusible or rupturable plug is installed at the rear of the steam chest. This plug is designed to rupture at 100 pounds of steam pressure, thereby letting the entire contents out of vulcanizer.



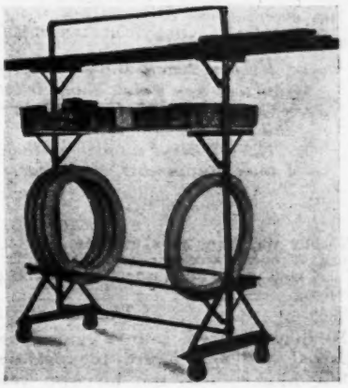
STINE SCREW HOLES

Stine Screw Holes are made of brass by the Stine Screw Holes Co., Waterbury, Conn., and are made in a variety of sizes to suit all kinds of work. The cut shows one with a screw attached being driven into a piece of wood.



SUPER-WELD STOCK AND TIRE RACK

Tires, tubes and accessory stocks can be displayed on this rack, which is of rugged construction. The base is 30 in. wide and 62 in. long, while the height is 84 in. The rack can be obtained as illustrated, with a section for tires, another for boxed or small goods and a third for piping and steel bar stock, or extra rails may be had so that the entire rack can be used for the stocking of tires. The top brackets are 18 in., the center and lower brackets are 24 in., the latter having tire rails. The rack is furnished without casters, the base being drilled for attaching to the floor. Large, easy rolling swivel casters can be obtained as special equipment. The rack is shipped knocked down. Made by the Welded Products Mfg. Co., Milwaukee,



BESCO LEAD MALLET

The No. 61 Lead Mallet is most useful in tapping moulds to remove castings or for forcing separator into group and groups into jars. Ten inches over all. Besco Lead Mallet, each, 50 cents. Battery Equipment & Supply Co., 1458 S. Michigan Avenue, Chicago.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Houston	South Texas Fair	Nov. 8-18
Jersey City	Third Annual Automobile Show	Nov. 11-18
Los Angeles	Automobile Show, Motor Car Dealers' Association	Nov. 11-18
Chicago	Annual Show of the Automotive Equipment Association	Nov. 13-18
Cincinnati, O.	Second Annual Automobile and Radio Exposition	Nov. 23-29
New York	Eighteenth Annual Automobile Salon	Dec. 3-9
New York	Annual Show	Jan. 6-13
New York	National Automobile Body Builders' Show	Jan. 8-13
Oakland, Cal.	Fifth Annual Show	Jan. 13-20
Cleveland, O.	Annual Winter Show, Cleveland Automobile M'f'r's' and Dealers' Assn.	Jan. 20-27
Chicago	Annual Show at Coliseum N. A. C. C.	Jan. 27-Feb. 3
Chicago	Annual Automobile Salon	Jan. 27-Feb. 3
Ann Arbor, Mich.		Jan. 29-Feb. 3
Minneapolis, Minn.	Annual Show	Feb. 3-10
Lansing, Mich.		Feb. 5-10
Kalamazoo, Mich.		Feb. 12-17
Flint, Mich.		Feb. 12-17
San Francisco	Exposition, Auditorium	Feb. 17-24
Gr'd Rapids, Mich.		Feb. 19-24
Mt. Clemens, Mich.		Feb. 19-24
Des Moines, Ia.	Annual Show	Feb. 23-Mar. 3
Brooklyn, N. Y.	Annual Automobile Show of the Brooklyn Motor Vehicle Dealers' Association	Feb. 24-Mar. 3
Muskegon, Mich.		Feb. 26-Mar. 3
Syracuse, N.Y.	Annual Automobile Show	Feb. 26-Mar. 3
Springfield, Mass.	Annual Automobile Show	Feb. 26-Mar. 3
Bay City, Mich.		Mar. 5-10
Newark, N. J.	Annual Automobile Show	Mar. 10-17
Port Huron, Mich.		Mar. 12-17
Battle Creek, Mich.		Mar. 19-24
Alpena, Mich.		Apr. 2-7

CONVENTIONS

Chicago	Annual Meeting Automotive Equipment Association	Nov. 13-18
Toledo	Annual Convention of the Ohio Automotive Trades' Assn.	Dec. 6-8

FOREIGN SHOWS

London	Annual Show	Nov. 3-11

RACES

San Carlos, Calif.—500-Mile Armistice Day Race	Nov. 11
Los Angeles, Calif.	Nov. 30
San Diego, Calif.	January

SQUEEKS & RATTLES

If You Know Any, Tell Them to Us

"A DOLLAR DOWN—"

Mr. Spendix: "Any installments due today?"
Mrs. Spendix: "No, dear, I think not."
Mr. Spendix: "Any payments due on the house, furniture, radio, books, rugs?"
Mrs. Spendix: "No."
Mr. Spendix: "Then I have ten dollars we don't need. What do you say we buy a new car?"

Crude Stuff

Dear Mrs. McGowan across the hall was telling someone of the trouble she was having with her car.

"But everyone has trouble lately," she said, "and it's all because of the manufacturers using them raw materials at the factory."

Helpful Small Boy—I beg your pardon, sir, but your car was stolen about ten minutes ago.

Car Owner—Well why didn't you raise an alarm and stop the thieves?

Boy—I never thought of that, sir but it's all right I took the number of the car.

—The Lightning Line.

PRECISELY

Nobody was hurt when a Moose Jaw street car hit an automobile and turned it over twice the other day. In automobile circles, this must be the kind of a car that is spoken of as a "desirable turnover."—An outsider.

The Miracle Man

A man walked into a garage where his car was being repaired and was heard to reprimand the garage owner for telling him how to run his own car, saying, "This is my car and what I say goes."

A moment later a tired, greasy mechanic looked up from under the car and said, "For goodness' sake, say 'engine.'"

White Mule Henry—Bill, I wancha t'be more careful. Firs' thing you know you'll have us in the ditch.

Rasin Jack Bill (in astonishment)—Me? Why I thot you was drivin'.—"The Lightning Line."

Smarty

"I drove a hundred miles—speeded the whole distance—wet all the way and didn't skid a bit."

"What were you driving?"

"A yacht."

OR ARE THERE CANARIES IN THE VALVE CAGE?

Margie: "What's the matter with the car? It squeaks dreadfully."
Frankie: "Can't be helped, there's pig iron in the axles."

RIGHT BACK AT HIM

An opulent-appearing man drove up to the curb in a car that was not so opulent and was accosted by a small boy:

"Watch yer auto fer a nickel, mister."

"Beat it, kid, this machine won't run away."

"Naw, but I could call you when it starts to fall apart."

Quite So, Quite So

It's rather easy to meet expenses these days. You run into them every time you turn around.—Tom Walsh, Springfield, O.

Wancoma, Neb., Oct. 20.

Dear Friend Hi:

I no it aint my turn to rite to you but I thot mebbe you would want to no how was I gettin along in the garage here in Wancoma, so I will write you a few lines to let you no how I am.

Last Friday, I was over to the factry at Owassa on a drive out. I guess them berds at the factry saw a reel driver fer wunce in there lives. Believe, me Hi, them guys dont no no more about a car than a fish does about the Sara dessert or they wouldunt titan all them nuts up so's a guy hasta krank the engine by hand and then they goes an puts a sine on the wind sheeld that says dont drive this car over 15 miles per our. Aint that good? But I guess you know, Hi, about how much I listened to them berds.

Its 2 hundred and 78 miles from Owassa to Wancoma an I made it in 5 ours with 13 minits so I gess I didunt drive no 15 miles per our, eh Hi? An you no when a guy averages fifty 5 miles per our they is some of the time he is goin 60 five and thats me all over.

On that ashfalt road betwene Morning Sun an Winterset is where I made the bess time. Believe me, Hi, I didunt give them korn fed natives none of my side o the road and I gess they thot mebbe was I a guvment driver seein my factry lisense which I didunt have none behind.

When I gets home the boss says, how many times did I stop an I no's he was kiddin me as when he went over on a drive out, he was 4teen ours comin home, so he didunt say a other word but his face got red like he was ashamed an he started pawin thru a lot of my old pay checks an I nose right away I was do fer a raze but I didunt say nothin, cause he might think I was braggin on myself——

Well, Hi I aint had to do nuthin much since but jess run errants and watch the other guys in the shop do the work, me no'in the boss wasunt takin no chances on me skinin my hands so I couldunt make a other drive out.

You better rite rite away an let me no can you go with me nex time an I will let you no about the raze or mebbe if them berds at the factry want me to cum over there and fiks up there cars fer a drive out I will let you no how do I like my new work,

Your ole pal,

OSCAR.

The shades of night were falling fast,
He stepped on the throttle and hurried past,
A crash in the darkness—the man was dead.
What did they find when they opened his head?
Excelsior.

—Boston Transcript.

Buy a Car, Mister

Muggins: "Yes, I'm living out in the country, now. It certainly has its disadvantages."
Huggins: "What do you miss most?"
Muggins: "The last train home."

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Acason	¾–1	$1650a	3¾x5	34x5n	34x5n	W
Acason RB	1½	1950	3¾x5¼	36x3½	36x6	W
Acason H	2½	2750	4⅜x5¾	36x4k	36x8k	W
Acason L	3½	3450	4½x5¾	36x5k	36x10k	W
Acason M	5	4350	5 x6¼	36x6	40x12	W
Ace	30	1½–1½	2400	3⅝x5	34x3½	34x6
Ace	40	2	2850	4⅛x5¼	36x4	36x7
Ace	60	2½–3	3400	4½x5¼	36x4	36x8
Acme	20	1	....	3¾x5	35x5n	35x5n
Acme	30	1½	....	3¾x5	34x3½	34x5
Acme	40	2	....	3¾x5	34x3½	34x5
Acme	60	3	....	4½x5¼	36x4	36x7
Acme	60L	3	....	4½x5½	36x4	36x7k
Acme	90	4½	....	4½x5½	36x5	40x10
Acme	125	6¼	....	4¾x6	36x6	40x12
American	25	2½	3350	4 x6	36x4k	36x4dk
American	40	4	4275	4½x6	36x5k	36x5dk
American	50	5	4500	4½x6	36x5	36x12
Armleder	20	1	....	3¾x5¼	34x3½k	34x6k
Armleder	21	1½	....	3¾x5¼	34x3½k	34x6k
Armleder	40-B	1½	....	4¼x5½	34x3½k	34x6k
Armleder	40-C	1½	....	4½x5¼	34x3½k	34x6k
Armleder	HW-B	2½	....	4¼x5½	36x4k	36x7k
Armleder	HW-C	2½	....	4½x5¼	36x4k	36x7k
Armleder	KW-B	3½	....	4½x6	36x5k	36x5dk
Armleder	KW-C	3½	....	4½x5½	36x5k	36x5dk
*Atlas	22	1	1495	3¾x5½	34x4½n	34x4½n
*Atlas	44	1½–2	1950	3¾ 5⅛	36x6n	36x6n
Atterbury	20R	1½	2475	3¾x5	34x3½	34x5
Atterbury	22C	2½	3375	4½x5¼	36x4	36x4d
Atterbury	22C	2½	3475	4½x5¼	36x4	36x4d
Atterbury	22D	3½	4275	4½x5½	36x5	40x5d
Atterbury	22D	3½	4375	4½x5½	36x5	40x5d
Atterbury	8E	5	4975	4¾x6	36x5	40x6d
Atterbury	8E	5	5125	4¾x6	36x5	40x6
Autocar	21UF	1½–2	1950	4¾x4½	34x4k	34x6
Autocar	21UG	1½–2	2050	4¾x4½	34x4k	34x6
Autocar	27H	2-3	2950	4 x5½	34x5	36x7
Autocar	27K	2-3	3075	4 x5½	34x5	36x7k
Autocar	26Y	4-6	3950	4¼x5½	34x6	36x12
Autocar	26-B	4-6	4100	4¼x5½	34x6	36x12
Available	H1½	1½	2475	4 x5	36x3½k	36x5k
Available	H2	2	2775	4 x5	36x3½k	36x6k
Available	H2½	2½	3160	4 x5	36x4k	36x8k
Available	H3½	3½	4175	4½x5½	36x5	40x5d
Available	H5	5	5375	5 x6	36x6	40x12
*Avery		1	....	3 x1s	34x5n	34x5n
Beck	A Jr.	1¼	1285a	3½x5	34x4½n	34x4½n
Beck	B-30	1½	1350	3¾x5	34x5	36x6
Beck	C-40	2	1550	3¾x5	36x6	36x6
Beck	D-50	2½	1950	4½x5¼	38x7	40x8
Bell	M (Iowa)	1	1495	3⅝x5½	35x5	35x5n
Bell	E (Iowa)	1½	2100	3¾x5¼	34x3½	34x5
Bell	O (Iowa)	2½	2550	4½x5½	34x4	34x6
Bessemer	G	1	....	3½x5	35x5n	35x5n
Bessemer	H-2	1½	....	3¾x5	36x3½	36x5
Bessemer	J-2	2½	....	4½x5¼	36x4	36x4d
Bessemer	K-2	4	....	4½x5½	36x5	36x10
Bethlehem	KN	1	1195	3½x5	35x5n	35x5n
Bethlehem	GN	2	1795	4 x6¼	34x4	34x6k
Bethlehem	GN	3	2495	4 x5¼	36x4k	36x8k
Bridgeport	A	1½	....	3⅝x5½	34x3½	34x6
Bridgeport	B	2½	....	4½x5½	36x4	36x4d
Bridgeport	C	3½	....	4½x6	36x5	36x10
Brinton	C	2	2500	3¾x5	34x4	34x5
Brinton	D	3	2975	4½x5¼	36x4	36x7
Brockway	E	1	....	4 x5	33x5n	33x5n
Brockway	S-5	1½	....	4 x5	36x4	36x6
Brockway	SK	1½	....	4½x5¼	36x4	36x6
Brockway	KR	2½	....	4½x5½	36x4	36x8
Brockway	K-5	2½	....	4½x5¼	36x4	36x8
Brockway	RT	3½	....	4¾x6	36x5	36x10
Brockway	R-4	3½	....	4½x5½	36x5	36x5d
Brockway	T-4	5	....	4¾x6	36x6	40x6d
*Buick		½	945b	3⅝x4¾	31x4n	31x4n
Case		2	....	4¼x5¾	36x6	38x7
*Chevrolet		¼	510b	3½x4	30x3½n	30x3½n
*Chevrolet	G	¾	650	3½x4	34x4n	34x4½n
*Chevrolet	T	1	1095	3½x5¼	33x4n	35x5n
Chicago	C1	1½	....	4 x5	36x3½k	36x5k
Chicago	C2	2½	....	4 x5	36x4k	36x7k
Chicago	C3	3½	....	4½x5½	36x5	36x10
Chicago	D5	5	....	4½x5½	36x6	40x12
Clydesdale	10	¾–1½	1485	3¾x5	34x5n	34x5n
Clydesdale	10A	¾–1½	1535	3¾x5	34x5n	34x5n
Clydesdale	18	¾–1½	1890	3¾x5	34x5	34x5
Clydesdale	20	1–1½	2385	3¾x5	34x5	34x5k
Clydesdale	42	1½–2	2475	3¾x5	36x3½	36x6
Clydesdale	65X	2½–3	3250	4½x5¼	36x4	36x8
Clydesdale	65EX	2½–3	3450	4½x5½	36x4	36x8
Clydesdale	90	3½–4½	4100	4½x5½	36x5	36x10
Clydesdale	120	5–6	4500	4¾x6	36x6	40x12
Comet	T	1½	1950	3¾x5	34x4	34x4
Commerce	9	¾–1½	1150	3⅜x5	32x4½n	32x4½n
Commerce	T	¾–1½	1450	3⅜x5	34x4½n	34x4½n
Commerce	10	¾–1½	2500	3⅜x5	33x5n	33x5n
Commerce	12	1½	1695	3⅜x5	34x3½	34x4
Commerce	12	1½	1800	3¾x5	35x5n	35x5n
Commerce	16	2	1995	3⅜x5	34x4	34x6
Commerce	16	2	2150	3¾x5	35x5n	36x6n
Commerce	18	2½	$2150	4½x5½	36x4	36x7
Commerce	18	2½	2495	4½x5¼	36x6n	40x8n
Commerce	25	2½	2425	4½x5¼	36x4	36x7
Commerce	25	2½	2770	4½x5¼	36x6	40x8n
Cook	51	2½	3600	4 x5⅛	36x6n	40x8n
*Corbitt		¾–1	1250	3½x5	33x5n	33x5n
Corbitt	E-22	1	1480	3¾x5	34x3½	34x4
Corbitt	D-22	1½	2200	3¾x5	34x3½	34x5
Corbitt	C-22	2	2600	4½x5¼	36x3½	36x7
Corbitt	B-22	2½	3000	4½x5¼	36x4	36x7
Corbitt	R-22	3	3200	4½x5½	36x4	36x8
Corbitt	A-22	3½–4	3800	4½x5½	36x5	36x10
Corbitt	AA-22	5	4500	4¾x6	36x6	40x6d
Day-Elder	AS	1	1600	3¾x5	35x5n	35x5n
Day-Elder	B	1½	2000	3¾x5	34x3½	34x5
Day-Elder	D	2	2400	4½x5¼	36x4	36x7
Day-Elder	C	2½	2750	4¼x5½	36x4	36x7
Day-Elder	F	3½	3150	4½x5½	36x5	36x5d
Day-Elder	E	5	4250	4½x6	36x5k	40x6dk
Dearborn	E	1	1600	3⅝x5½	35x5n	35x5n
Dearborn	FX	1½	2300	3¾x5½	34x4	34x5
Dearborn	F	1½	2180	3¾x5½	34x4	34x5
Dearborn	48	2	2590	3¾x5½	34x4½n	34x7
Defiance	G	1	1525	3¾x5	35x5n	35x5n
Defiance	D	1½	1815	3¾x5	35x5n	36x6n
Defiance	E	2	2075	3¾x5	35x5n	38x7n
Denby	31	1¾	1485	3¾x5	35x5n	35x5n
Denby	33	1½	2145	3¾x5	35x5n	38x7n
Denby	35	2½–3	2795	4½x5¼	36x4	36x7
Denby	27	4	3895	4½x5½	36x5	36x5d
Denby	210	5	4295	4½x5½	36x6	40x6d
Dependable	A	¾–1	1650	3⅝x5½	34x5n	36x6n
Dependable	C	2	2350	3¾x5¼	34x3½	34x5
Dependable	D	2½	2650	4 x5½	34x5	36x6
Dependable	E	3	2950	4¼x5½	36x4	36x7
Diamond T	O-3	1–1¼	1975	3¾x5¼	36x3½n	36x4n
Diamond T	T	1½	2250	3¾x5¼	36x3½	36x5
Diamond T	U	2–2½	2650	4 x5¼	36x4	36x7
Diamond T	K	3½	3750	4¼x5½	36x5	36x5d
Diamond T	EL	5	4325	4½x5½	36x6	40x6d
Diamond T	S	5	4500	4¾x6	36x6	40x6d
Doane		2½	4100b	4½x5¾	36x5	36x7
Doane		3½	5100b	4⅝x5¾	36x5	36x5d
Doane		6	6000b	5 x6¼	36x6	40x6d
*Dodge Brothers		¾	730	3⅞x4½	32x4n	32x4n
Dorris	K-2	1	2490	4 x5½	33x5n	33x5n
Dorris	K-4	2–2½	3400	4¼x5½	36x4	36x7
Dorris	K-7	3½	4400	4¼x5½	36x5	36x10
*Dort	103	½	685a	3½x5	31x4n	34x4n
Double Drive	B	3	4000	4½x5½	36x6	36x6
Duplex	A	2	2775	4 x5¼	35x5n	38x7n
Duplex	E	3½	3500	4½x5½	36x8	36x8
Duty	22	2	1590	3½x5	34x3½	34x5
Eagle	101	1½	1875	3⅝x5¼	34x5	34x5
Eagle	100-2	2	2275	3¾x5¼	34x4k	34x7k
E. W. D.	B	3	4200	4¾x5½	36x6	36x6
Fageol	1½	1½	3000	3¾x5¼	34x3½k	34x6k
Fageol	2½	2½	3900	4¾x5¾	34x4	36x7
Fageol	3½	3½	5000	4½x6¼	36x5k	40x5dk
Fageol	5	5	5700	4½x6¼	36x6	40x6d
Fargo	R	2	1700	3¾x5	36x4	36x6
*Federal		1½	1375	3¾x5	—x5n	—x5n
Federal	SD	1½	1800	3¾x5	35x5n	36x6n
Federal	TE	1½	2175	4½x5¼	36x3½	36x5
Federal	UE	2–2½	2425	4½x5¼	36x4	36x7
Federal	WE	3½–4	3150	4½x5½	36x5	36x5d
Federal	X2	5–6	4500	4¾x6	36x6	40x6d
*Ford	TT	1	380	3¾x4	30x3½n	32x4½n
Front Drive	C	1½	2800	3¾x5½	36x6	36x6
G.M.C.	K16	1	1295	3½x5½	34x5n	34x5n
G.M.C.	K-41A	2	2375	4 x5½	36x4k	36x7k
G.M.C.	K-41B	2	2375	4 x5½	36x4k	36x7k
G.M.C.	K-41T	5†	2450	4 x5½	36x4	36x8
G.M.C.	K-71A	3½	3600	4½x6	36x5	40x5d
G.M.C.	K-71B	3½	3700	4½x6	36x5	40x5d
G.M.C.	K-71T	10†	3700	4½x6	36x5	40x12
G.M.C.	K-101A	5	3950	4½x6	36x5	40x6d
G.M.C.	K-101T	15†	4050	4½x6	36x5	40x14
G.M.C.	K-101B	5	4050	4½x6	36x5	40x6d
G.W.W.		1½	1850	3⅜x5½	35x5	35x5
*Garford	15	1	1590	3⅝x5½	34x5n	34x5n
Garford	25-B	1½	1990	3¾x5¼	36x3½	36x5
Garford	70-H	2½	2750	4¼x5½	36x4	36x8
Garford	77- D	4	3750	4½x6	36x5	36x5d
Garford	68- D	5	4500	5 x6½	36x5	40x6d
Garford	150-A	7½	5200	5 x6½	36x6	40x7d
Gary	F	1–1½	1775	3¾x5	36x3½	36x5
Gary	I	2	2450	4 x5½	36x3½	36x6
Gary	J	2½	2850	4¼x5½	36x4	36x8
Gary	K	3½	$3790	4½x6	36x5	40x5d
Gary	M	5	4450	5 x6½	36x6	40x6d
Gersix	M	1½	3100	4 x5½	36x3½	36x7
Gersix	K	2½	3500	4½x5½	36x4	36x8
Gersix		3½	4500	4½x6	36x5	40x12
Gotfredson	20	1	2075	3¾x5½	34x5	34x5
Gotfredson	31	1½–2	3000	4 x5¼	36x6	38x7n
Gotfredson	A	2½	3375	4 x5¼	36x4	36x7
Gotfredson	B	3½–4	4475	4½x5½	36x5	36x10
Gotfredson	100	5–6	5500	5 x6½	36x6	40x14
Graham Bros.		1	1265	3⅞x4½	33x4½n	34x5n
Graham Bros.		1½	1325	3⅞x4½	33x4½n	36x6n
1Gramm-Pion.	10	1	1245	3½x5	33x5n	33x5n
1Gramm-Pion.	15	1½–2	1750a	3¾x5	36x3½k	36x5k
1Gramm-Pion.	65	1½–2	2250a	3¾x5	36x3½k	36x5
1Gramm-Pion.	20	2–2½	2475a	4½x5¼	36x4k	36x7k
1Gramm-Pion.	30	3	3300a	4¼x5½	36x5k	36x5dk
1Gramm-Pion.	75P	3½	4225a	4½x5½	36x6n	42x9n
1Gramm-Pion.	40	4	3850a	4½x5½	36x5	36x5dk
1Gramm-Pion.	50	5–6	4450a	4¾x6	36x6	40x6dk
Hall	1½	1½	3100	3¾x5	34x5n	38x7n
Hall	2½	2½	3275	4½x5¼	36x4	36x6
Hall	3½	3½	4100	4½x5½	36x5	36x5d
Hall	5	5	5100	4½x5½	36x5	40x6d
Hall	7 chain	7	5100	4½x5½	36x5	40x6d
Harvey	W OA	2	2650	4¾x5½	34x4	34x7
Harvey	WFA	2½	2950	4¾x5½	36x4	36x7
Harvey	WHA	3½	3950	4½x6	36x5	36x5d
Hawkeye	O	1	1375	3⅝x5½	34x5n	34x5n
Hawkeye	K	1½	1645	3¾x5½	34x3½k	34x5k
Hawkeye	M	2	2145	4¼x5	36x4k	36x6k
Hawkeye	N	3½	3700	4½x6¾	36x5k	36x10k
Hendrickson	O	1½	2200	3⅝x5½	36x4n	36x5n
Hendrickson	N	2½	2690	4¼x5¾	36x4k	36x7k
Hendrickson	M	3½	3000	4¼x5	36x5k	36x5dk
Hendrickson	K	5	4000	5 x6¼	36x6	40x6
Huffman	B	1½–2	1795	3¾x5	34x3½	34x6
Huffman	C	1½–2	1695	3¾x5½	36x3½	36x6
Huffman	D	2–3	2895	4¼x5½	36x4	36x7
Hurlburt	A-A	1–1½	1950	3¾x5	34x5n	34x5n
Hurlburt	B-B	2–2½	2800	4¼x5½	36x4	36x4d
Hurlburt	C-C	3–3½	3475	4¼x5½	36x5	36x5d
Hurlburt	D- D	4–4½	4150	4½x6	3..x5	36x6d
Hurlburt	E-E	6–6½	4850	4¾x6½	36x6	40x6d
Indep'd't(Iowa)	B	1	1665	3½x5	34x3½	34x4
Indep'd't(Iowa)	G	1½	2040	3¾x5¼	34x3½	34x5
Indep'd't(Ia.).	HI	2½	2940	4½x5¼	36x4	36x7
*Indiana	10	1	....	3¾x5¼	34x5n	34x5n
Indiana	12	1½–2	....	3¾x5¼	34x3½k	34x5k
Indiana	20	2	....	4½x5½	36x4k	36x7k
Indiana	25	2½–3	....	4½x5½	36x4k	36x8k
Indiana	35	3½–4	....	4¾x5½	36x5k	36x5dk
Indiana	51	5–7	....	5 x6¼	36x5k	40x6dk
*International	S	1	1250	3½x5	32x4½n	32x4½n
International	21	1	1550	3½x5¼	36x3½k	36x3½
International	31	1½	1650	3½x5¼	36x3½k	36x5k
International	41	2	2100	3½x5¼	36x3½k	36x6k
International	52	2½	3500	4½x5	36x6n	36x6dn
International	61	3	2400	4¼x5	36x4k	36x7k
International	62	3	2600	4¼x5	36x4	36x7
International	101	5	3600	4¼x5	36x5	40x12k
International	102	5	3800	4¼x5	36x5	36x12
Jackson	4WD	3½	3850	4½x5½	36x7	36x7
K-Z	1	1	1750	3½x5	34x3½	34x5
K-Z	1½	1½	2075	3¾x5	36x4	36x6
K-Z	2½	2½	2550	4½x5¼	36x4	36x8
K-Z	3½	3½	3350	4½x5½	36x5	40x10
K-Z	5	5	3850	4½x5½	36x6	40x6d
Kalamazoo	T	1	1295	4 x5	34x5	34x5n
Kalamazoo	G-1	1½	1800	3¾x5	34x4	34x5
Kalamazoo	LG	2	2645	4 x5	36x4	36x7
Kalamazoo	NH	3	3145	4 x6	36x5	36x10
Kalamazoo	HD	3	3350	4¼x6	36x5	36x10
Kalamazoo	SK	4	3845	4¼x6	36x5	36x12
Kalamazoo	OK	5	4350	4½x6	36x6	40x6d
2Kelly-S	K-31	1½	2700	3⅜x5¼	36x3½	36x6
2Kelly-S	K-34	1½	2700	3¾x5¼	36x3½	36x6
2Kelly-S	K-38	2½	2900	3¾x5¼	36x4	36x4d
2Kelly-S	K-35	2½	2900	3¾x5¼	36x4	36x4d
2Kelly-S	K-40	3½	3900	4½x6½	36x5	40x5d
2Kelly-S	K-41	3½	3900	4½x6½	36x5	36x10
2Kelly-S	K-42	3½	3900	4½x6½	36x5	40x5d
2Kelly-S	K-50	5	4400	4½x6½	36x6	40x6d
2Kelly-S	K-60	6	4600	4½x6½	36x6	40x7d
2Kelly-S	K-61	5–7	4800	4½x6½	36x6	36x7d
Kimball	AB	2	3675	4 x6	36x4	36x7
Kimball	AC	2½	3975	4¼x6	36x4	36x8
Kimball	AK	3	4500	4½x6	36x4	36x10
Kimball	AE	4	5000	4¾x6	36x5	40x12
Kimball	AF	5	5500	5 x6	36x6	40x7d
*Kissel	Express	1	1585	3⅞x5½	34x5n	34x5n
Kissel	Utility	1½	1975	3⅞x5½	36x3½	36x6
Kissel	Freighter	2½	2875	4¼x5½	36x4	36x8
Kissel	H. D.	4	3675	4¼x5½	36x5	36x12
Kleiber	AA	1	2200	4¼x5¼	34x3½k	34x5k
Kleiber	A	1½	3100	4½x5¼	36x3½k	36x6k

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.
r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac.—tractor. †Capacity with semi-trailer.

1—Gramm-Pioneer. 2—Kelly-Springfield.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Kleiber.....BB	2	$3600	4½x5¼	36x4k	36x7k	W
Kleiber.....B	2½	3950	4½x5½	36x5k	36x8	W
Kleiber.....C	3½	4600	4½x5½	36x5	36x5d	W
Kleiber.....D	5	5300	5 x6½	36x6	40x12	W
Koehler.....D	1½	2150	3½x5	34x3½	34x5	W
Koehler.....M	2½	3175	4 x5½	36x4	36x7	W
Koehler.....MCS	2½	3275	4 x5½	36x4	36x7	W
Koehler.....F	3½	4470	4½x5½	36x5	36x10	W
Koehler,MT. Trac	5	3275	4 x5½	36x4	36x7	W
Krebs.....23	¾	1360	3¾x5	34x4½	34x4½	B
Krebs.....24	1	1675	3¾x5	34x5	34x5	W
Krebs.....45	1½	2275	4½x5¼	36x4	36x7	W
Krebs.....75	2½	2550	4½x5½	36x4	36x8	W
Krebs.....110	3½	3175	4½x5½	36x5	40x10	W
Krebs.....140	5	....	4¾x6	36x6	40x6d	W
Larrabee.....X-2	1	1925	3½x4½	34x5n	34x5n	B
Larrabee.....U	1½	2400	3¾x5	34x3½	34x5	W
Larrabee.....J	1½-2½	2400	3¾x5	34x3½k	34x5k	W
Larrabee.....K	2½-3	3100	4½x5¼	36x4	36x7	W
Larrabee.....K-5	2½-3½	3450	4½x5½	36x4	36x8	W
Larrabee.....L-4	3½-5	4000	4½x5½	36x5	36x5d	W
Larrabee.....W	5-7	4800	4¾x6	36x6	40x6d	W
Maccar.....L	1½	....	4½x5¼	36x4	36x6	W
Maccar.....H-A	2	....	4½x5¼	36x4	36x4d	W
Maccar.....H-2	3	....	4½x5½	36x4	36x5d	W
Maccar.....M-3	4	....	4½x5½	36x5	36x6d	W
Maccar.....G	5-6	....	4¾x6	36x5	40x6d	W
MacDonald.....A	7½	5750	4½x6	40x7	40x14	I
Mack...AB D.R.	1½	3450	4 x5	36x4k	36x3½dk	D
Mack...AB Chain	1½	3000	4 x5	36x4k	36x3½dk	C
Mack...AB Chain	2	3300	4½x5	36x4k	36x4dk	C
Mack...AB D.R.	2	3750	4½x5	36x4k	36x4dk	D
Mack...AB D.R.	2½	3850	4½x5	36x4k	36x4dk	D
Mack...AB Chain	2½	3400	4½x5	36x4k	36x4dk	C
Mack...AC Chain	3½	4950	5 x6	36x5k	40x5dk	C
Mack...AC Chain	5	5500	5 x6	36x6	40x6d	C
Mack...AC Chain	6½	5750	5 x6	36x6	40x12	C
Mack...AC Chain	7½	6000	5 x6	36x7	40x7d	C
Mack Trac...AB	5	3400	4¼x5	36x4	36x4d	C
Mack Trac...AC	7	4950	5 x6	36x5	40x5d	C
Mack Trac...AC	10	5500	5 x6	36x6	40x6d	C
Mack Trac...AC	13	5750	5 x6	36x6	40x12	C
Mack Trac...AC	15	6000	5 x6	36x7	40x7d	C
*Mapleleaf.....**	1½	3000	3¾x5¼	34x5n	36x6n	W
Mapleleaf...AA**	2	3600	4 x5¼	36x4	36x7	W
Mapleleaf...BB**	3	4050	4¼x5½	36x4	36x4d	W
Mapleleaf...CC**	4	4800	4½x5½	36x5	36x5d	W
Mapleleaf...DD**	5	5625	4½x5½	36x6	40x6d	W
Master.....JW	1½	2290	4½x5½	34x3½	34x5	W
Master.....JD	1½	2590	4½x5½	34x3½	34x6	D
Master.....Z	2	2290	4½x5½	34x3½	34x5	W
Master.....W	2½	2890	4¼x5½	34x4	36x8	W
Master.....DD	2½	3190	4¼x5½	34x4	36x7	D
Master.....A	3½	3999	4½x6	36x5	40x8	W
Master.....E	3½	4290	4½x6	36x5	40x5d	D
Master.....Y	4	4490	4½x6	36x5	40x6d	D
Master.....B	5	4999	4¾x6½	36x6	40x6d	W
Master.....F	5	5090	4¾x6½	36x6	40x6d	D
MasterTrac.,DDT	6	3390	4¼x5½	34x4	36x7	D
*Maxwell.....1½	1½	932	3½x4½	32x3n	32x4n	W
*Menominee.....	1	1650	4 x5	34x5n	34x5n	W
Menominee...HT	1-1¼	2000	3¾x5	34x3½	36x5	W
Menominee...H	1½	2175	4 x5	36x3½	36x5	W
Menominee...D	2-2½	2875	4 x6	36x4	36x8	W
Menominee...G	3½	3800	4½x6	36x5	36x10	W
Menominee...J-3	5	4250	4¾x6	36x6	40x12	W
Moline.....10	1½	1985	3½x5	34x5n	36x6n	I
6Moreland..R. R.	1	1595	4 x5	34x5n	34x5n	B
Moreland.....BX	1½	1980	4 x5	36x3½	36x6k	W
Moreland.....EX	2	2800	4½x5¾	36x4	36x7k	W
Moreland.....AX	3	3500	4½x5½	36x5	36x10k	W
Moreland.....RX	4½-5	4600	4¾x6	36x6	40x6	W
Nash.....2018	1-1½	1595	3¾x5¼	34x4	24x5	I
Nash.....3018	2-2½	2150	3¾x5¾	34x4k	34x7k	I
Nash.....Quad	2-2½	2750	4¼x5½	36x6	36x5k	I
Nash..3018, LWB	2-2½	2200	3¾x5¾	34x4k	34x7k	I
Nash..Quad.LWB	2-2½	2800	4¼x5½	36x6	36x6	I
Nash.....5018	2½	2250	3¾x5¼	34x4k	34x7k	I
4Nelson.....G2	1½	....	4½x5½	36x3½	36x6	W
4Nelson.....G3	2½	....	4½x5½	36x4	36x7	W
4Nelson.....G4	3½	....	4½x5½	36x5	36x5d	W
4Nelson.....G5	5	....	4¾x6	36x6	40x6d	W
Netco.....DK	2	3100	4½x5¼	36x4k	36x7k	W
Netco.....HL	2½	3500	4½x5½	36x4k	36x8k	W
Niles.....E	2	3090	4½x5½	36x4k	36x7k	W
Noble.....A21	1¼	1750	3½x5¼	34x5	34x5	W
Noble.....B31	1½-2	2395	3¾x5¼	36x4	36x7	W
Noble.....D51	2½-3	2795	4¼x5¼	36x4	36x8	W
Noble.....E71	3½-5	3495	4½x6	36x5	36x10	W
Noble.....B30	1½	....	3¾x5¼	36x3½	36x5	W
Noble.....C40	2	....	4 x5½	36x4	36x7	W
Noble.....D50	2½	....	4¼x5½	36x4	36x8	W
Noble.....E70	3½	....	4½x6	36x5	36x10	W
Northwestern..W	1½	2700	4½x5¼	34x4	36x6	W
Northwestern..WS	2½	3500	4½x5½	36x4	36x8	W
Norwalk.....25E	1	1595	3½x5	34x3½	34x4	W
Norwalk.....35E	1½	1925	3½x5	34x3½	34x3½d	W
Norwalk,35E.Spec	1½	2285	3¾x5¼	34x3½	34x5	W
Ogden.....A2	1	....	3½x5	34x5n	34x5n	W
Ogden.....D	1½	....	3¾x5	36x3½	36x5	W

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Ogden.....E	2½	....	4½x5¼	36x4	36x8	W
Old Hickery...W	1	$1775	3¾x5	36x3½k	36x4k	W
Old Reliable....A	1½	2350	4 x5	34x4	36x6	W
Old Reliable....B	2½	3500	4½x6	34x4	36x4d	W
Old Reliable....C	3½	4250	4½x6	36x5	36x5d	W
Old Reliable....D	5	5000	4¾x6	36x6	40x6d	W
Old ReliableKLM	7	6000	4¾x6¼	36x6	40x7d	C
*Oldsmobile Econ	1	1095	3½x5¼	35x5n	35x5n	I
Olympic.....A	2½	3200	4¼x5½	36x4	36x8	W
Oneida.....B9	1½	2825	4 x5¼	36x3½	36x7	
Oneida.....C9	2½	3200	4 x5¼	36x4	36x8	
Oneida.....D9	3½	4050	4½x5½	36x5	36x10	
Oneida.....E9	5	4725	4½x5½	36x6	40x12	
Oshkosh.....A	2	2485	3½x5	36x6n	36x6n	B
Oshkosh.....AA	2	2585	3½x5	36x6n	36x6n	B
Oshkosh.....B	2½	3485	4 x5½	38x7n	38x7n	B
Oshkosh.....BB	2½	3585	4 x5½	38x7n	38x7n	B
*Overland.....4	½	425	3½x4	30x3½n	30x3½n	B
Packard.....EC	2-3	3100	4½x5½	36x4	36x7	W
Packard.....EX	2-2½	3100	4½x5½	36x6n	40x8n	W
Packard.....ED	3½-4½	4100	4½x5½	36x5	36x5d	W
Packard.....EF	5-7½	4500	5 x5½	36x6	40x6d	W
Paige.....52-19	1½	1950	4 x5¼	34x3½	34x5	W
Paige.....54-20	2½	2420	4½x5½	34x4	34x8	W
Paige.....51-18	3½	3145	4½x5½	36x5	36x5d	W
Parker.....C-22	1	1875	3¾x5¼	34x5n	34x5n	W
Parker.....G-22	2½	3200	4¼x6	34x4	36x4d	W
Parker.....J-20	3½	3950	4½x6	36x5	40x5d	W
Parker.....M-20	5	4850	5 x6	36x6	40x6d	W
Patriot.....Revere	1	1380	3¾x5	35x5n	35x5n	W
Patriot.....Lincoln	2	2050	4 x5¼	34x4	34x6	W
Patriot.....LS-800	2	2175	4 x5¼	[illegible]		
Patriot .Washgt'n	3	2900	4½x5½	36x5	36x7	W
Pierce-Arrow....	2	3200	4 x5½	36x4	36x4d	W
Pierce-Arrow....	3½	4350	4½x6¾	36x5	36x5d	W
Pierce-Arrow....	5	4850	4½x6¾	36x5	40x6d	W
Pittsburgher....	1½-2	3000	3¾x5	36x4	36x6	..
Pittsburgher....	3	3800	4½x5½	36x5k	36x8	W
Power.....F	2	3150	4 x5¼	36x5	36x7	W
Power.....C	3½	....	4½x5½	36x5	40x10	W
Premocar...B-143	1½	2475	3½x5	36x6n	36x6n	W
*Rainier....R-21	¾	....	3½x5	35x5n	35x5n	W
Rainier.....R-29	1	....	3¾x5	34x3½	34x4	W
Rainier.....R-26	1½	....	3¾x5	34x3½	34x5	W
Rainier.....R-28	2	....	4½x5¼	34x4	34x6	W
Rainier.....R-20	2½-3	....	4½x5¼	34x4	34x7	W
Rainier.....R-15	3½-5	....	4½x5½	36x5	36x5d	W
Rainier.....R25	3½-5	....	4½x5¼	36x5	36x5d	W
Rainier.....R-17	5-6	....	4¾x6	36x6	40x6d	W
Rainier.....R27	6	....	4¾x6	36x6	40x6d	W
Ranger...TK-20-2	1½	1450	3¾x5	36x6n	38x7n	W
*Reo.....F	¾-1½	1185	4½x4½	34x4½n	34x4½n	B
Reliance.....10A	1½	2400	4 x5½	36x3½	36x5	I
Reliance.....20B	2½	3100	4¼x5½	36x4	36x4d	I
Republic.....75	¾	1395b	3½x5	32x4½n	32x4½n	I
Republic.....10	1	1395	3¾x5	34x3	34x4	I
Republic..10 Exp	1	1695	3¾x5	34x5n	34x5n	I
Republic.....11X	1½	1795	3¾x5	34x4	34x6	I
Republic.....19	2½	2195	4½x5¼	36x4	36x7	I
Republic.....20	3½	3095	4½x5½	36x5	36x10	I
Rowe.....CW	1½	3000	3¾x5	36x6n	36x6n	W
Rowe....C.D.W.	2	3300	4 x5	34x4	36x3½d	W
Rowe....G.S.W.	3	4150	4 x6	34x5	36x5d	W
Rowe....G.P.W.	3	5250	3¼x5r	38x7n	42x9n	W
Rowe.....HW	4	4500	4¼x6	36x5	36x6d	W
Rowe....F. W.	5	4850	4½x6	36x6	40x6d	W
Ruggles.....20	1	1195	3¾x5	34x5n	34x5n	B
Ruggles.....40	2	1795	4 x5	34x5n	34x7	D
Samson.....15	¾	....	4-3½x4	32x4n	32x4n	B
Samson.....25	1¼	....	4-3½x5½	35x5n	35x5n	B
Sanford....W-15	1½-2	2150b	3¾x5	36x3½k	36x5k	..
Sanford.....25	2½-3½	....	4½x5¼	36x4	36x4d	W
Sanford.....35	3½-5	....	4½x5½	36x5	36x5d	W
Sanford.....50	5-7	....	4¾x6	36x5	40x6d	W
Schacht....2-Ton	2	3200	4¼x5½	36x4	36x7	W
Schacht....3-Ton	3	3800	4½x5½	36x5	36x5d	W
Schacht....4-Ton	4	4200	4½x6	36x5	40x5d	W
Schacht....5-Ton	5	4400	4½x6	36x5	40x6d	W
Schacht....7-Ton	7	5050	4½x6	36x6	40x7d	W
Schwartz.....A	1	1685	3½x5	34x4½n	34x4½n	B
Schwartz.....K	2	3000	3¾x5¼	34x3½	34x7	W
Schwartz.....L	3	3600	4¼x5½	36x4	36x8	W
Schwartz.....M	5	4900	4½x6	36x6	40x12	W
Selden.....30	1½-2½	2250	3¾x5	34x3½	34x5	W
Selden.....31	1½-2½	3350	4½x5¼	34x5a	38x7n	W
Selden.....50	2½-3½	3250	4½x5¼	36x4	36x7	W
Selden.....51	2½-3½	4350	4½x5½	36x6n	40x8n	W
Selden.....70	3½-5	3750	4½x5½	36x5	36x10	W
Selden.....90	5-7	4950	4¾x6	36x5	40x12	W

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Seneca.....M	½	$ 820	3½x4½	30x3½n	30x3½n	B
*Service.....12	¾	....	3¾x4½	32x4½n	32x4½n	B
*Service.....25	1¼	....	3¾x5½	34x5n	34x5n	B
Service.....21	1½	....	3½x5½	34x3½	34x5	W
Service.....32	2	....	4 x5½	36x3½	36x7	W
Service.....37	2	....	4¼x5½	35x5n	38x7n	W
Service.....52	3	....	4¼x5½	36x4	36x8	W
Service.....72	3½	....	4¼x5½	36x5	36x5d	W
Service.....77	4	....	4½x6	36x5	36x5d	W
Service.....10Z	6	....	4½x6	36x6	40x6d	W
Signal.....NF	1	1450	3¾x5	34x5n	36x6n	W
Signal.....H	1½	1950	4½x5¼	34x4	36x6	W
Signal.....J	2½	2375	4½x5¼	34x4	36x8	W
Signal.....M	3½	3175	4½x5½	36x5	40x5d	W
Signal.....R	5	3900	4¾x6	36x6	40x6d	W
*Standard.....75	1¼	1330	3¾x5	33x5n	33x5n	W
Standard.....1-K	1½	1600	3¾x5	34x3½k	34x5k	W
Standard.....76	2½-3	2400	4½x5¼	36x4k	36x8	W
Standard.....66	3½-5	3150	4½x5½	36x5	36x12	W
Standard.....5-K	5-7	4400	4¾x6	36x6	40x14	W
*Star.....	½	610b	3½x4¼	30x3½n	30x3½n	B
Sterling.....1½	1½	2885	4 x5¼	36x3½k	36x5k	W
Sterling.....2	2	3085	4 x5¾	36x4k	36x6k	W
Sterling.....2½	2½	3290	4½x5¾	36x4k	36x4dk	W
Sterling.....3½	3½	4325	4½x6¼	36x5k	40x5dk	W
Sterling.....5-W	5	4950	5 x6¼	36x6	40x6d	W
Sterling.....5-C	5	5500	5 x6¼	36x6	40x6d	C
Sterling.....7½	7½	6000	5 x6¼	36x6	40x7d	C
*Stewart...Utility	¼-1½	1245	3½x5½	34x4½n	34x4½n	I
Stewart.....15	1½-1½	1445	3½x5½	35x5n	35x5n	I
Stewart.....9	1½-2	1790	3¾x5	34x3½	34x6	I
Stewart.....7-X	2½-3	2390	4¼x5½	34x4	34x8	I
Stewart.....10-X	3½-4	3190	4½x6	36x5	36x10	I
*Stewart.....	1¼	1245	4-3½x5½	34x4½	34x4½	
*Stoughton.....	¾	1095	3½x5	34x4½n	34x4½n	B
Stoughton.....A	1	1790	3¾x5¼	34x5n	34x5n	W
Stoughton.....B	1½	2150	3¾x5¼	36x3½	36x5	W
Stoughton.....D	2	2490	4 x5½	36x4	36x7	W
Stoughton.....F	3	3150	4¼x5½	36x5d	36x5d	W
Sullivan.....E	2	2800	4¼x5½	36x4k	36x7k	W
Sullivan.....H	3½	3750	4½x6	36x5	36x5d	W
*Themart.....	1¼	1795	4 x5¼	34x5	34x5	C
Tiffin.....GW	1½	2100	4½x5¼	36x3½	36x5	W
Tiffin.....MW	2½	2700	4½x5¼	36x4	36x3½d	W
Tiffin.....PW	3½	3600a	4½x5½	36x5	40x5d	W
Tiffin.....PW	5	4300	4¾x6	36x6	40x6d	W
Tiffin.....UW	6	4500	4¾x6	36x6	40x12	W
Titan.....	2	2750	4 x5	36x4k	36x7k	D
Titan.....	2½	2950	4¼x5½	36x4k	36x8k	D
Titan.....	3½	3950	4½x6	36x5k	40x10k	D
Titan.....	5	4550	4½x6	36x5	40x12	D
Tower.....J	1½	2000	4½x5¼	35x5n	38x7n	W
Tower.....H	2½	2475	4½x5½	36x4	36x7	W
Tower.....G	3½	3475	4½x5½	36x5	36x5d	W
Traffic.....	1½	1595a	3¾x5	35x5n	35x5n	I
Traffic.....C	2	1595a	3¾x5	34x3½k	34x5k	I
Traffic.....	3	1895a	3¾x5	36x4	36x7	I
*Transport.....15	1	1295	3¾x5	32x4½n	32x4½n	B
Transport.....25	1½	1495	3¾x5¼	34x3½k	34x5k	I
Transport.....35	2	1885a	3¾x5	36x3½k	36x6k	I
Transport.....55	3	2385	4½x5¼	36x4k	36x8k	I
Transport.....60	3½	2585	4¼x5½	36x4k	36x8k	I
Transport.....75	5	3485	4½x6	36x4k	36x12k	I
Traylor.....B	1½	2390	3¾x5½	34x3½	34x5	W
Traylor.....C	2-2½	2850	4 x5½	36x4	36x7	W
Traylor.....D	3-3½	2300	4¼x5½	36x4	36x8k	W
Traylor.....F	5-6	4700	4½x6	36x6	40x6d	W
*Triangle.....AA	1	1285	3½x5	34x4½n	34x4½n	I
Triangle.....A	1½-2	1985	3¾x5¼	34x3½k	34x6k	I
Triangle.....C	2-2½	2285	3¾x5½	36x4k	36x7k	I
Triangle.....B	2½-3	2585	4 x5¾	36x4k	36x7k	I
Twin City...B.W.	2	2400	4 x5½	36x6	40x8	I
Twin City...A.W.	3½	3500	4¼x6	36x5	40x5d	W
5Twin City.....B	3½	....	5½x6	36x6	36x6	I
5Twin City.....A	5	....	5½x6	36x7	36x7	I
Ultimate.....A	2	3150	4 x5¼	36x3½	36x6	W
Ultimate.....AJ	2	3200	4¼x5½	36x3½	36x6	W
Ultimate.....AJL	2	3250	4¼x5½	36x3½	36x6	W
Ultimate.....B	3	3700	4¼x5½	36x4	36x4d	W
Ultimate.....BL	3	3800	4¼x5½	36x4	36x4d	W
Ultimate.....D	5	5500	5 x6½	36x6	40x12	W
United.....A	1½	2445	3¾x5¼	36x3½k	34x5k	W
United.....B	2½	3150	4¼x5½	36x4k	36x7k	W
United.....C	3½	3975	4¼x5½	36x5	36x5d	W
United.....V	5	4500	4½x6	36x6	40x6d	W
*United States..U	1¼	1800	3½x5½	34x5n	34x5n	B
UnitedStates,NW	1½-2	2375	3¾x5	36x5	36x3½	W
United States..N	1½-2	2175	3¾x5	36x3½k	36x5k	I
United States..R	3	3300	4 x5¼	36x4	36x4d	W
United States..S	4	4075	4½x5½	36x5	36x5d	W
United States...T	5-7	4975	4¾x6½	36x6	40x6d	W
Velie.....46	1½	1585	3¾x5	36x3½k	36x5k	I
Velie.....53	2½	2185	4 x5½	36x4k	36x7k	I
Veteran.....M**	1½	2699	3¾x5¼	35x5n	35x5n	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.
r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac.—tractor.

3—Moreland Road Runner. 4—Nelson Le Moon. 5—Twin City Four Wheel Drive.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Veteran.....P**	2	$3699	4¼x5½	36x4	36x7	W
Veteran.....R**	3	4200	4¼x5½	36x4	36x7	W
Veteran.....S**	4	5395	4½x6	36x5	36x10	W
*Vim.....29	½	1050	3⅛x4½	31x4n	31x4n	W
*Vim.....50	½-¾	995	4 x5	32x4n	32x4n	B
Walker-JohnsonA	2	2500	3¾x5	34x3½	34x6	W
Walker-JohnsonB	3	3000	4¼x5½	36x4	36x8	W
Walter.....M	2½	3850	4½x5¾	36x4	36x8	D
Walter.....S	5	4850	4½x6¼	36x6	40x6d	W
*Watson.....C	1	1465a	3⅝x5½	35x5n	35x8n	W
Watson.....N	3½	4250	4½x5½	36x5	36x10	W
Western....W1½	1½	2450	4⅛x5¼	36x3½k	36x5k	W
Western....L1½	1½	2450	3¾x5	36x3½k	36x5k	W
Western....W2½	2½	3250	4⅛x5¼	36x4	36x7	W
Western....L2½	2½	2450	4¼x6	36x4	36x7	W
Western....W3½	3½	4000	4½x6	36x5	40x5d	W
*White.....15	¾	2400	3¾x5½	34x5n	34x5n	B
White.....20	2	$3250	3¾x5½	36x4k	36x7k	D
White.....40	3½	4200	3¾x5¾	36x5	40x5d	D
White.....45	5	4500	4¼x5¾	36x6	40x6d	D
White Hick....E	1	1225	3¾x5	34x5n	34x5n	W
White Hick....H	1½	1375	3¾x5	36x3¾	36x5	W
White Hick....K	2½	1675	4½x5¼	36x4	36x5	W
Wichita.....K	1	1875	3¾x5¼	36x3½	36x4k	W
Wichita.....M	2	2400	3¾x5¼	36x3½k	36x6k	W
Wichita.....RX	3	3200	4⅜x5¾	36x4k	36x8k	W
Wichita.....O	4	$3500	4½x6¼	36x5k	36x5k	W
Wilcox.....AA	1	1900	3¾x5½	36x4k	36x4k	W
Wilcox.....BB	1½	2550	4¼x5	36x4	36x5	W
Wilcox.....D	2½	3000	4¼x5	36x4k	36x3½dk	W
Wilcox.....E	3½	3950	4½x6	36x5k	36x5dk	W
Wilcox.....F	5	4350	4¾x6½	36x5	40x6d	W
Wilson.....F	1½	2270	3¾x5	36x3½	36x5	W
Wilson.....EA	2½	2825	4½x5¼	36x4	36x7	W
Wilson.....G	3½	3685	4½x5½	36x5	36x5	W
Wilson.....H	5	4520	4¾x6	36x6	40x6	W
*Wisconsin.....A	1	1750	3¾x5	34x5n	34x5n	W,B
Wisconsin.....B	1½	2100	3¾x5	35x5	36x6	W
Wisconsin.....C	2½	2700	4 x5¾	36x6n	36x7	W
Wisconsin.....D	3½	3000	4⅝x5¾	36x6n	40x8	W
Wisconsin.....E	5	3500	4½x6¼	36x6	36x10	W
Wisconsin.....F	7	4000	5 x6¼	36x6	36x12	W
Witt-Will.....N	1½	2450	3¾x5	36x3¼k	36x6k	W
Witt-Will.....P	2½	2900	4½x5¼	36x4k	36x8k	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm. r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac—tractor.

Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity
Allis-Chal.G.P	6-12	$250	2	LeR.	4-3⅛x4½	Gas.	1
Allis-Chalm...	15-25	1185	4	Midw.	4-4½x5¼	Gas.	3
Allis-Chalm...	20-35	1885	4	Own	4-4¾x6½	GorK	3-4
‡Allis-Chalm.	20-35	2085	4	Own	4-4¾x6½	G	4
Allwork...2-G	14-28	1595	4	Own	4-4¾x6	GorK	3
Allwork.....C	14-28	1395	4	Own	4-5 x6	GorK	3
¶ARO.1921-22	3-6	385	4	Own	1-4½x5	Gas.	1
Aultman-T....	15-30	1900	4	Clim.	4-5 x6½	G,K,D	4
Aultman-T....	22-45	2800	4	Own	4-5½x8	G,K,D	6
Aultman-T....	30-60	4000	4	Own	4-7 x9	G,K,D	8-10
Automot. B-3.	12-24	1250	4	Herc.	4-4 x5½	Gas.	2-3
Avery,SR.Cul.	5-10	....	4	Own	4-3 x4	G,K	..
Avery..Cult-C	....	....	3	Own	6-3 x4	G,K	..
Avery.....B	5-10	....	4	Own	4-3 x4	G,K	2
Avery.....C	....	....	4	Own	6-3 x4	G,K	..
Avery.....	8-16	....	4	Own	2-5½x6	G,K,D	2-3
Avery.....	12-20	....	4	Own	4-4¾x6	G,K,D	2-3
§Avery.....	....	....	*	Own	4-4x5½	G,K,D	3-4
Avery.....	12-25	....	4	Own	2-6½x7	G,K,D	2-3
Avery.....	14-28	....	4	Own	4-4¾x7	G,K,D	3-4
Avery.....	18-36	....	4	Own	4-5½x6	G,K,D	4-5
Avery.....	25-50	....	4	Own	4-6½x7	G,K,D	5-6
Avery.....	45-65	....	4	Own	4-7¾x8	G,K,D	8-10
Bates Mule.H	15-25	....	4	Midw	4-4½x5¼	Gas.	3
Bates Mule..F	18-25	....	*2	Midw	4-4½x5¼	Gas.	3
‡Bates MuleG	25-35	....	*2	Midw	4-4½x6	Gas.	..
Bear.....	25-35	4250	*2	Ste.	4-4¾x6¼	Gas.	4
¶Beeman Jr..	¾-1½	180	2	B&S	1-2½x2½	Gas.	..
¶Beeman...G	2-4	240	4	Own	1-3½x4½	Gas.	....
Best.....	30	....	*2	Own	4-4¾x6½	G,K,D	4
Best.....	60	....	*2	Own	4-6½x8½	G,K,D	8-9
¶Bolens.....	....	....	4	B & S.	1-2½x2½	G.	..
Boring.....	5-10	395	4	LeR.	4-3½x4½	G	..
Boring...1921	.....	1850	3	Wauk	4-4⅜x5¾	GorK	2
**Bryan.....	15-30	....	4	Own	2-4 x5	K.	3
Capital.....	15-30	1000	2	Own	4-4⅜x6	Gas.	3
Case.....	12-20	1050	4	Own	4-4½x5	G,K,D	2-3
Case.....	15-27	1320	4	Own	4-4½x6	G,K,D	3-4
Case.....	22-40	2550	4	Own	4-5½x6¾	G,K,D	4-5
Case.....	40-72	5200	4	Own	7 x8	G,K,D	8-10
Caterpillar T35	15	....	*2	Own	4-4 x5½	Gas.	3
Caterpillar .5T	25	....	*2	Own	4-4¾x6	Gas.	4
Caterpillar 10T	40	....	*2	Own	4-6½x7	Gas.	6
Centaur.....	5-2½	345	2	N Way	2-4½x4½	GorK	1
Cletrac.....F	9-16	595	*2	Own	4-3¼x4½	G,K,D	2
Cletrac.....W	12-20	1345	*2	Own	4-4 x5½	G,K,D	2-3
Dakota.....4	15-27	1500	3	Dom,	4-4¾x6	Gas.	3
Dill.....D	20	2380	4	Cont.	4-4½x5½	Gas.	3
Dill.....R.W.	20	2980	4	Midw.	4-4½x6	Gas.	3
Do-It-All,Baby	1	237	..	Own	1-2¾x2¾	Gas.	1
Do-It-All....A	3-6	495	..	Own	1-4½x5	Gas.	1
Do-It-All, Jack	6	395	..	Own	1-3⅜x3⅜	Gas.	1
Do-It-All....6	12	495	2	Own	2-3⅜x3⅜	Gas.	1
Eagle.....F	12-22	....	4	Own	2-7 x8	GorK	3-4
Eagle.....H	16-30	....	4	Own	2-8 x8	G or K	4-5
E-B.....AA	12-20	1095	4	Own	4-4¾x5	G,K,D	3
Fageol.....D	9-18	1175	4	Lyc.	4-3½x5	Gas.	2
Farm Horse.B	18-30	1885	4	Clim.	4-5 x6½	G,K	4
Fitch..4 Drive	20-35	1850	4	Clim.	4-5 x6½	GorK	3-4
Fordson.....	-18	$ 395	4	Own	4-4x5	G.K	2
Frick.....A	12-20	....	4	Erd.	4-4 x6	G,K	2-3
Frick.....C	15-28	....	4	Beav.	4-4¾x6	G,K	3-4
Grain Belt,..A	18-36	2150	4	Wauk.	4-4¾x6¾	G or K	4
Gray.....	20-36	1975	3	Wauk.	4-4¾x5¼	Gas.	4
Gray.....	22-44	2165	3	Wauk.	4-5 x6¼	Gas.	4-5
Gt. Western St	20-30	1950	4	Beav.	4-4¾x6	K	4
Hart-Parr..20	20	865	4	Own	2-5¼x6½	K,D.	2
Hart-Parr..30	30	1045	4	Own	2-6½x7	K,D.	3
‡Hart-Parr..	....	1395	4	Own	6½x7	K.D.	..
Heider.....D	9-16	628	4	Wauk	4-4¼x5¾	G,K	2
Heider.....C	12-20	725	4	Wauk	4-4½x6¾	G,K	3
Heider...Cult	5-10	800	4	LeR.	4-3½x4½	Gas.	1
Huber Light 4.	12-25	985	4	Wauk	4-4½x5¾	G or K	3
Huber Super 4	15-30	1885	4	Midw.	4-4½x6	Gas	3
Indiana.....F	5-10	665	2	LeR.	4-3½x4½	Gas.	1-2
International .	8-16	†670	4	Own	4-4¼x5	G,K,D	2
Internatl.Titan	10-20	†700	4	Own	2-6½x8	G,K,D	3
International..	15-30	1750	4	Own	4-5¼x8	G,K,D	4
¶Kinkade....	1½-3	190	1	Own	1-3 x3	Gas.	....
La Crosse.....	12-24	985	2	Own	2-6 x7	G,K	3
Lauson.....5	12-25	1295	4	Midw.	4-4½x5¼	Gas.	3
Lauson.....21	15-30	1675	4	Beav.	4-4¾x6	G or K	3-4
‡Lauson Road	15-30	2000	4	Beav.	4-4¾x6	K	....
Leader.....B	12-18	685	4	Own	2-6 x6¼	G,K,D	2-3
Leader.....N	16-32	1725	4	Clim.	4-5 x6½	G,K	3-4
‡Leader...GU	18-35	2150	*2	Clim.	4-5 x6½	G,K	3-4
Linn.....H4J	40-	4500	*	Cont.	4-4½x5½	Gas	4
Linn.....W	60	5000	*	Wauk	4-5 x6¼	Gas	6
Little Giant, B	16-22	2200	4	Own	4-4½x5	K	4
Little Giant, A	26-35	3300	4	Own	4-5½x6	K	6
Lombard.1922	85-150	8950	*2	Wisc.	6-5½x6¾	Gas.	16
Lombard.1922	50	5300	*2	Wisc.	4-4¾x6½	Gas.	6-10
MerryGar1922	2	210	2	Evin	1-2⅝x2½	Gas.	..
Minne...All-P	12-25	800	4	Own	4-4½x7	G or K	3
Minne. Gen.P	17-30	1600	4	Own	4-4¾x7	G or K	3-4
Minne. Med.D	22-44	2650	4	Own	4-6 x7	G or K	5-6
MinneHeavyD	35-70	3850	4	Own	4-7¼x9	G or K	8-9
Mohawk .1922	8-16	650	2	Light	4-3¼x4½	K or G	1-2
Moline Univ D	9-18	650	2	Own	4-3½x5	Gas.	2-3
Moline Orch..	9-18	....	2	Own	4-3½x5	Gas.	2-3
‡Monarch.....	20-30	3500	*2	Beav.	4-4¾x6	G,K,D	4
Motor Macult,	1½	195	2	Own	1-2¾x3½	Gas.	..
NB.....1	3-6	375	4	Own	2-3¾x4	Gas.	1
Nichols-Shep.	20-42	2650	4	Own	2-8 x10	G or K	3-6
Nichols Shep.	25-50	3000	4	Own	2-9 x12	G or K	4-8
Nichols-Shep.	35-70	3650	4	Own	2-10½x14	G or K	8-12
Nilson Senior..	20-40	1975	5	Wauk	4-5 x6¼	G,K	4
OilPull.....K	12-20	....	4	Own	2-6 x8	K,D	3
OilPull.....H	16-30	....	4	Own	2-7 x8½	K,D	4
OilPull.....G	20-40	....	4	Own	2-8 x10	K,D	5-6
OilPull.....E	30-60	....	4	Own	2-10x12	K,D	8-10
¶Oldsmar ..K	2½-5	$225	4	Own	1-5½x5½	Gas.	1
Pioneer.....G	18-36	....	4	Own	4-5½x6	G,K,D	4
Pioneer.....C	40-75	....	4	Own	4-7 x8	Gas.	10
Plowman.....A	15-30	1295	4	Buda	4-4½x6	G,K	3-4
Reliable.....	10-20	390	4	Own	2-6 x7	Ker.	2
Russell.....	12-24	1500	4	Own	4-4¼x5¾	G or K	2-3
Russell.....	15-30	2200	4	Own	4-5 x6½	G or K	3-4
Russell.....	20-35	3000	4	Own	4-5½x7	G or K	4-5
Russell.....	30-60	5000	4	Own	4-8 x10	G or K	8-10
Samson....M	....	445	4	Own	4-4 x5½	G,K	2
Sandusky,...J	10-20	1250	4	Own	4-4¼x5¾	G,K,D	2
Sandusky...E	15-35	1750	4	Own	4-5 x6½	G,K,D	4
¶Shelby.....	1	150	3	B & S	1-2½x2½	G	..
Shelby.....D	15-30	....	4	Beav.	4-4¾x6	G,K	3
Shelby.....C	9-18	....	4	Wauk	4-3¾x5¼	G or K	2
Toro Cultivator	6	750	3	LeR	4-3½x4½	Gas.	2
ToroTractor'22	6-10	495	3	LeR	4-3½x4½	Gas.	2
Townsend....	10-20	800	2	Own	4-6½x7	Ker.	2-3
Townsend....	15-30	1350	2	Own	4-7 x8	Ker.	3-4
Townsend....	25-50	2500	2	Own	4-8½x10	Ker.	4-8
Traction Motor	40-50	.....	4	....	8-3½x5	Gas.	4-5
Traylor....TB	6-12	500	4	LeR.	4-3½x4½	Gas.	1-2
Trundaar...10	25-40	3750	*2	Wauk	4-5 x6¼	G or K	4
Twin City....	12-20	1200	4	Own	4-4¼x6	G,K	3
Twin City....	20-35	2750	4	Own	4-5½x6¾	G,K	5-6
Twin City....	40-65	4750	4	Own	4-7¾x9	G,K	8-10
Uncle Sam C20	12-20	1295	4	Weid.	4-4 x5½	G	2-3
Uncle Sam B19	20-30	1985	4	Beav.	4-4¾x6	G or K	3-4
Uncle Sam D21	20-30	1895	4	Beav.	4-4¾x6	G or K	3-4
Utilitor....501	2½-4	295	4	Own	1-3½x4½	G	1
Utilitor...501A	2½-4	340	4	Own	1-3½x4½	G	1
Wallis.....K	15-25	....	4	Own	4-4½x5¾	G,K	3
Waterloo.....N	12-25	675	4	Own	2-6½x7	Ker.	3
Wetmore21-22	12-25	1185	4	Wauk	4-4 x5¾	G,K	3
Whitney.....D	9-18	595	4	Own	2-5½x6½	Gas.	2
Wichita.....T	15-30	2000	4	Beav.	4-4½x6	G,K,D	3-4
Wisconsin...E	16-30	1850	4	Clim.	4-5 x6½	G or K	3
Wisconsin...F	20-40	2050	4	Wauk	4-5 x6¼	G or K	4
Wisconsin...H	22-40	2550	4	Clim.	4-5½x7	G or K	4-6
Yuba....12-20	12-20	2400	*2	Wauk.	4-4½x6¾	G,K,D	3
Yuba....15-25	15-25	2750	*2	Wisc.	4-4¼x6	G,K,D	..
Yuba....20-35	20-35	3900	*2	Wisc.	4-5¾x7	G,K,D	4
Yuba....25-40	25-40	4250	*2	Wisc.	4-5¾x7	G,K,D	..
‡Yuba.....	25-40	4750	*2	Yuba	4-5½x7	D	..

ABBREVIATIONS: G—Gasoline. K—Kerosene. D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Make: Beav.—Beaver. B & S—Briggs & Stratton. Clim.—Climax. Cont.—Continental. Dom.—Domas Evin.—Evinrude. Herc.—Hercules. LeR.—LeRoy. Midw.—Midwest. Nway.—New Way. Nor.—Northway. Ste.—Stearns. Wauk.—Waukesha. Weid.—Weidely. Wis.—Wisconsin. *—Crawler type All others are wheel type. †Price includes plows §Track Runner. ‡Industrial Tractor. ¶Garden Tractor. **Steam Tractor

Specifications of Current Passenger Car Models

PRICES 2-Pass.	5-Pass.	7-Pass.	Sport	Coupe	Sedan	Wheel Base	Tires	Engine Make	Cylinders: Bore and Stroke	Rated Horse Power (N.A.C.C.)	NAME AND MODEL	Carbureter	Starting and Lighting	Ignition	Clutch: Type and Make	Gearset	Universal: Type and Make	Rear Axle Type and Make	†Gear Ratios
.....	$4500c	$4500	.....	.....	$6500	136	33x5	Cont.	6-3 5/8x5 1/4	31.54	Ambassador R	Strom.	West.	Bosch.	m-d	B-L.	f	Norwalk.	F	Tim.	4.45
$1995c	1785	1850	$1885c	.....	2485	127	33x4 1/2	H-S.	6-3 1/2x5	29.40	American D-66	Strom.	G-D.	A-K.	s-p	B&B.	m	Hartford.	F	Salis.	4.50
.....	1195	.....	.....	$1450c	.....	114	32x4	Cont.	6-3 1/2x4 1/4	23.44	Anderson. Aluminum 6	.....	West.	West.	s-p	B&B.	.....		.....	Salis.	.....
1495 / 1785p	1495	1595	1595c / 1945c	1995c	1995d	120	33x4	Cont.	6-3 5/8x4 1/2	27.34	Anderson Series 40	Rayfield.	Remy	Remy	s-p	B&B	Durston.	f	Snead	3/4F	Salis.	4.50
.....	2620	2645	.....	3625	3695	130	34x4 1/2	Own.	8-3 1/2x5	33.80	Apperson 8-21-S	Johnson.	Bijur	Remy	m-d	Own	Own	m	Sterling	1/2F	Own.	4.25
1575	1475	1545n	1895n / 1995n	2275	2345	121	32x4	Cont.	6-3 5/8x4 1/4	27.34	Auburn 6-51	Strom.	Remy	Remy	s-p	B&B	G-L	m	Universal.	F	Salis.	4.75
.....	1395	.....	.....	....	1850d	118	32x4	Cont.	6-3 1/8x4 1/4	23.44	Barley	.....	Delco	Delco	s-p	B&B	Fuller.	f	M&E	.....	Col.	....
1800	1800	.....	.....	2400	2500	121	32x4	Cont.	6-3 1/4x4 1/2	25.35	Bay State	Strom.	Delco	Delco	s-p	B&B	Warner.	m	Spicer	3/4F	Col.	4.67
2950	2950c	.....	.....	3950	3950	121	32x4	Buda.	4-3 3/4x5 1/8	22.50	Biddle B1 & B5	Zenith.	G-D.	Simms.	s-p	Warner	Warner.	m	Spicer	1/2F	Std.	4.50
5000	5000	.....	.....	.....	7000	125	32x4 1/2	Own.	4-4 x5 1/2	25.60	Brewster 91	Zenith.	USL.	Bosch.	c	Own	Own	F	Own.	F	Own.	3.92
865	885	725g	.....	1175	(1395 / 1325	109	31x4	Own.	4-4 1/2x4 3/4	18.23	Buick 1923-34-5-6-7-38	Marvel.	Delco	Delco	m-d	Own	Own	m	Own	3/4F	Own.	4.66
1175	1195	975g	.....	1935	1985	118	33x4	Own.	6-3 5/8x4 1/2	27.34	Buick 1923-41-4-5-47	Marvel.	Delco	Delco	m-d	Own	Own	m	Own	3/4F	Own.	4.60
.....	.....	1435	1625a / 1675c	1895	2195	124	34x4 1/2	Own.	6-3 5/8x4 1/2	27.34	Buick 1923-48-9-50-4-55	Marvel.	Delco	Delco	m-d	Own	Own	m	Own	3/4F	Own.	4.90
3100	3150	3150	.....	3875a / 3925d	4100	132	33x5	Own.	8-3 1/2x5 1/2	31.25	Cadillac 61	Own	Delco	Delco	m-d	Own	Own	m	Spicer	F	Tim.	4.50
1750	1790	.....	.....	2480	2575	122	32x4 1/2	Cont.	6-3 5/8x4 1/2	27.34	Case X	Rayfield.	Delco	Delco	m-d	Own	Own	f	Snead	1/2F	Col.	5.25
.....	1990	2250	1950	2480	2975	129	34x4 1/2	Cont.	6-3 5/8x5 1/8	31.54	Case W	Rayfield.	Delco	Delco	m-d	Own	Own	f	Arvac	3/4F	Col.	4.45
1185	1185	.....	.....	1595	2295	117	32x4	Own.	6-3 1/4x4 1/2	25.35	Chalmers 1922	Strom.	A-L.	Remy	m-d	Own	Own	m	Hardy	1/2F	Adams	5.13
.....	.....	1345	.....	.....	.....	122	32x4	Own.	6-3 1/4x4 1/2	25.35	Chalmers 1922	Strom.	A-L.	Remy	m-d	Own	Own	m	Hardy	1/2F	Adams	5.13
1495	1495c	1645	1595a	1995c	(2295d / 2375f	123	33x4	Own.	6-3 1/2x5	29.40	Chandler Six	Rayfield.	Bosch.	Bosch	s-p	B&B.	Own	f	Own	F	Own.	4.45
510	525	425g	.....	840c / 680k	860	102	30x3 1/2	Own.	4-3 1/16x4	21.53	Chevrolet Superior	Zenith / Holley	A-L	Remy / A-L	c	Own	Own	m	Own	1/2F	Own.	3.66
1085	995	.....	1260	1295a	1495	112	32x4	Own.	6-3 1/8x4 1/2	22.50	Cleveland 41	Strom.	Bosch.	Bosch	s-p	Own	Own	m	Mech	3/4F	Own.	4.45
2685	.....	2685	2685c	3285b	(3285c / 3685 f	127 1/4	33x5	Nort.	8-3 1/2x4 1/2	39.20	Cole 890	Johnson.	Delco	Delco	c	North.	North	m	Spicer	F	Col.	4.46
1475	1475	.....	1475c	1925c	1995d	115	32x4	Cont.	6-3 1/4x4 1/2	27.34	Columbia Elite	Strom.	A-L	A-K	s-p	B&B	Durston.	m	Spicer	3/4F	Tim.	....
995	985	.....	.....	.....	1395d	115	31x4	Cont.	6-3 1/8x4 1/4	23.44	Columbia Light Six	Strom.	A-L.	A-L.	s-p	B&B.	Durston.	m	Spicer	3/4F	Tim.	....
.....	1985	3085f	.....	2985d	3085f	125	33x4 1/2	Cont.	6-3 1/2x5 1/4	29.40	Comet C-53	Strom.	Wagner	Wagner	s-p	B&B.	Muncie.	m	Arvac	3/4F	Col.	4.45
1395	1395	.....	1495b / 1495c	2065b	2165d	116	32x4	Falls.	6-3 1/8x4 1/4	23.44	Courier	Till.	Bijur	A-K	s-p	B&B	Muncie.	f	Norwalk	3/4F	Col.	5.00
3000	3000	3000	.....	.....	4500	122 1/2	32x4	Cont.	6-3 5/8x5 1/4	31.54	Crawford 22-6-60	Strom.	West.	Bosch	m-d	B-L	B-L		Spicer	1/2F	Tim.	....
.....	.....	.....	3500	.....	.....	135	33x5	Cont.	6-3 5/8x5 1/4	31.54	Crawford-Dagmar 6-60	Zenith.	West	Bosch	m-d	B-L	B-L		Spicer	1/2F	Tim.	....
.....	.....	.....	.....	.....	.....	142	33x5	Own.	8-3 3/4x5	45.00	Cunningham V	Strom.	Delco	Delco	m-d	Own	Own	f	Snead	F	Tim.	4.23
4350b	4350c	4350	.....	5250	6000	132	33x5	Own.	8-3 1/2x5 1/4	39.20	Daniels D-19	Zenith.	Delco	Delco	m-d	Own	Own	m	Spicer	F	Tim.	....
.....	1295	.....	1495	1795	1795	114	31x4	Cont.	6-3 1/8x4 1/4	23.44	Davis 71	Strom.	Delco	Delco	s-p	B&B	Warner.	m	Peters	1/2F	Tim.	5.10
1595	1595	.....	1695	2095	.....	120	32x4	Cont.	6-3 5/8x4 1/2	27.34	Davis 61-67	Strom.	Delco	Delco	s-p	B&B	Warner.	m	Peters	3/4F	Tim.	5.15
1175	1175	1295c	1245	1545	1595	112	32x4	H-S.	4-3 1/2x5	19.60	Dixie Flyer H-S-70	Strom.	Dyneto.	Eisemann.	s-p	B&B	G-L	f	Hardy	F	Peru.	4.75
850	880	.....	.....	980h	1195d	114	32x4	Own.	4-3 7/8x4 1/2	24.03	Dodge Brothers	Stewart.	N.E.	N.E.	m-d	Own	Own	m	Own	1/2F	Own.	4.16
3350g	3950c	3950	.....	4985c	5750f	132	33x5	Own.	6-4 x5	38.40	Dorris 6-80	Strom.	West.	Bosch	m-d	Own	Warner.	m	Spicer	F	Tim.	4.23
865	865	.....	1015a / 1015d	1240 / 1020k	1370 / 1070k	108	31x4	D-Ly.	4-3 1/2x5	19.60	Dort 19-14	Carter.	Bosch	Conn	m-d	Detlaff	Own	m	Mech	3/4F	Flint.	4.66
1275	1275	.....	.....	1650	1975	104	30x3 1/2	Own.	4-2 5/8x4 1/2	11.03	Driggs	Zenith.	Bosch.	Bosch	s-p	Hoos.	Mech	m	Spicer	3/4F	Own.	4.75
6500	6500	6750	.....	7800	7800	134	33x5	Own.	8-3 7/8x5	26.45	Duesenberg Straight 8	Strom.	Delco	Delco	s-p	Own	Own	f	Own	1/2F	Own.	4.81
3000	3200	.....	.....	3800	4000	124	32x4 1/2	Own.	4-3 1/8x5 1/8	24.81	Du Pont A	Y&T	West	Eisemann.	m-d	B-L	B-L	m	Spicer		Col.	4.50
890	890	.....	.....	1365	1365	109	31x4	Cont.	4-3 7/8x4 1/4	24.03	Durant A-22	Till.	A-L.	A-L.	s-p	Own	Own	m,f	Spicer	3/4F	Adams	4.30
1600	1650	.....	.....	2250	2400	123 1/2	32x4 1/2	Anst.	6-3 1/4x4 1/2	25.35	Durant B-22	Rayfield.	A-L.	A-D.	s-p	Ansted	Warner.	m,f	Spicer	1/2F	Tim.	5.15
1485	1095	950g	.....	1395c	1795	112	32x4	Own.	4-3 1/2x5 1/4	18.91	Earl 40	Scoe.	A-L.	Conn	s-p	B&B.	Own	f	Own	1/2F	Own.	3.66
1095	1095	.....	1095	1345	.....	118	33x4	Lyc.	4-3 1/2x5	19.60	Elcar K-4	Strom.	Delco	Delco	s-p	B&B	Muncie.	m	Peters	3/4F	Salis.	4.50
1395	1395	.....	1395	1975	2065	118	33x4	Cont.	6-3 5/8x4 1/2	27.34	Elcar 8-R	Strom.	Delco	Delco	m-d	Warner	Warner.	m	Spicer	3/4F	Salis.	4.50
1125c	1125	.....	1165	1695	1645	118	33x4	Falls.	6-3 1/8x4 1/4	23.44	Elgin K-1	Strom.	West.	Wagner	s-p	B&B	Mech	m	Mech	3/4F	Col.	4.66
.....	1045	.....	.....	1145k	(1895 / 1245k	108 1/2	32x4	Own.	4-3 5/8x5	18.23	Essex	Own	Bosch	Bosch	m-d	Own	Own	m	Spicer	1/2F	Own.	4.66
269r	298s	235g	.....	530	(595 / 725	100	30x3 1/2	Own.	4-3 3/4x4	22.50	Ford T	Own	Own	Own	m-d	Own	Own	m	Own	1/2F	Own.	3.63
3900	3900	.....	.....	4900	4900	132	32x4 1/2	Own.	6-3 3/4x5	27.34	Fox 7F	Zenith.	West	Bosch	m-d	B-L	B-L		Spicer	1/2F	Tim.	4.45
1900	1950	1750g	.....	2750	2850	115	32x4	Own.	6-3 1/4x4	25.35	Franklin 10	Own	N.E.	A-K	s-p	B&B	Own	m	Spicer	1/2F	Own.	4.73
895	895	.....	.....	1095k	1345d	112	32x4	Lyc.	4-3 1/2x5	29.60	Gardner T-R & G	Carter.	West	West	s-p	B&B	Mech	m	Mech	3/4F	Flint.	4 80
1385	1385	.....	.....	1895	1915	116	32x4	Own.	6-3 1/8x4 1/2	23.44	Grant	Strom.	Bijur	A-K	s-p	B&B	Durston	m	Spicer	3/4F	Col.	4.66
490	490	.....	.....	.....	760	100	30x3 1/2	Own.	4-3 5/8x4	21.03	Gray	Scoe.	West	West	m-d	Own	Detroit.	m	Mech	1/2F	Tim.	3 90
2475	2475c	.....	3250	.....	3475	120	32x4 1/2	Weid.	4-3 3/4x5 1/2	22.50	H.C.S. Series 4	Strom.	Delco	Delco	m-d	B-L	B-L	m	Spicer	3/4F	Own	....
.....	.....	2650	.....	3450	3450	125	32x4 1/2	Own.	4-4 1/2x4 1/2	27.23	Handley-Knight	Till.	A-L.	A-L	m-d	Warner	Warner.	m	Spicer	1/2F	Tim.	4 90
.....	995	.....	.....	.....	.....	114	31x4	Cont.	6-3 1/8x4 1/4	25.35	Hanson 30	Marvel.	Delco	Delco	s-p	B&B	Detroit.			3/4F	Tim.	....
1595	1595	1795	.....	2475c	2585	121	32x4	Cont.	6-3 5/8x4 1/2	27.34	Hanson 60	Marvel.	Delco	Delco	s-p	B&B	Detroit.			3/4F	Tim.	....
.....	1345	1345c	.....	1950	1950	115	32x4	H-S.	4-3 1/2x5	19.60	Hatfield A-42	Zenith.	Dyneto.	Conn	s-p	B&B	G-L	m	Spicer	3/4F	Col.	4.66
2395	2395c	2395	.....	3095d	3395	132	33x5	Own.	6-3 1/2x5 3/16	29.40	Haynes 75	Strom.	L-N.	King.	s-p	Warner	Own	m	Universal.	3/4F	Own.	4.60
1545	1495	.....	1895a / 1895d	2095b / 2135p	2395d / 2695p	121	32x4 1/2	Own.	6-3 1/2x5	29.40	Haynes 55	Rayfield.	L-N	King	s-p	Warner	Own	m	Universal.	1/2F	Own.	4.11
.....	2500c	2500	.....	3300c	3600f	126	34x4 1/2	Own.	6-3 1/2x4 1/4	29.40	Holmes Series 4	Strom.	Dyneto.	Eisemann.	m-d	B-L	B-L	m	Spicer	1/2F	Tim.	4.90
.....	1525c	1575	.....	2570c	(1625k / 2295	126	34x4 1/2	Own.	6-3 1/2x5	29.40	Hudson Super 6	Own	Bosch	Bosch	m-d	Own	Own	m	Spicer	1/2F	Own.	4.45
1395	1395	.....	.....	.....	2295	120	32x4	Cont.	6-3 5/8x4 1/2	27 34	Huffman	Strom.	Dyneto	Conn	s-p	B&B	Covert				F	Salis.	....
1150 / 1025g	1150	.....	1250a	1635 / 1335k	1785	112	32x4	Own.	4-3 1/4x5 1/2	16.90	Hupmobile Series R	Strom.	West.	A-K.	m-d	Own	Own	m	Universal.	3/4F	Own.	4.87
.....	1485	1685c	.....	2985	2985	121	32x4 1/2	Cont.	6-3 1/4x4 1/2	25.35	Jackson 638	Strom.	A-L	Remy	s-p	B&B	Covert	f	Snead	3/4F	Salis.	4 75
995b	995	.....	1095a	1445c	1465d	112	31x4	Own.	6-3 1/4x5	25.35	Jewett Six	Strom.	Remy	A-K	m-d	Long	Warner	m	Mech	1/2F	Tim.	4.45
1895	1795	.....	.....	2785	2485	120	32x4	Own.	6-3 7/8x4 3/4	26.38	Jordan MX	Strom.	Delco	Delco	s-p	Detroit	Detroit.	m	Spicer	1/2F	Tim.	4.42
.....	.....	.....	2150c	.....	.....	124	32x4	Own.	6-3 7/8x4 3/4	26.38	Jordan H	Strom.	Delco	Delco	s-p	Detroit	Detroit.	m	Universal.	1/2F	Tim.	4.42
.....	985	.....	.....	1450	111	32x3 1/2	Gray.	4-3 1/2x5	19.60	Kelsey 4	Scoe.	Bosch	Bosch	f-d	Own	f-d	Own	.....		Own.	4.50
.....	985	.....	.....	1450	111	32x3 1/2	Gray.	4-3 1/2x5	19.60	Kelsey 4	Scoe	Bosch	Bosch	s-p	B&B	Detroit.	Snead			1/2F	Std.	4.75
.....	1525	.....	.....	2175	118	32x4	Walk'r	6-3 1/8x4 1/2	23.44	Kelsey 6	Strom.	Bijur	Bosch	f-d	Own	f-d	Own	.....		Own.	....
5000	5000	5250	.....	5000	6000	130	32x4 1/2	Own.	8-3 x5 1/4	28.80	Kenworthy 8-90											
1795	1795	.....	1795c	2400	2550	120	32x4 1/2	Own.	8-3 x5	28.80	King K	Ball&B	West.	A-K.	s-p	Detroit	Own	f	Hardy	F	Col.	4 08
.....	1885	2385	2385c	2975c	3075	124	32x4 1/2	Own.	6-3 7/8x5 1/2	26.38	Kissel 45	Strom.	Remy	Remy	m-d	Warner	Warner.	m	Spicer	F	Own.	3.92
1690	1690	1690	1890	2750	2890	121	33x4	Cont.	6-3 5/8x4 1/2	27.34	Kline Kar 6-55-K	Rayfield.	Wagner	Conn	s-p	B&B	G-L	f	Snead	1/2F	Std.	4.75

MISCELLANEOUS

a—2 Passenger, d—5 Passenger,
b—3 Passenger, e—6 Passenger,
c—4 Passenger, f—7 Passenger,
g—Chassis Price,
h—All Metal Type,
k—Soft Top Type,
n—Tire Size 32x4½,
p—Sport.
r—Price without starter and demountable rims. Price, complete, $364.
s—Price without starter and demountable rims. Price, complete, $393.
†Standard Phaetons.

ENGINE

Anst—Ansted
Cont—Continental
D.-Ly—Dort Lycoming
H-S—Herschell-Spillman
Lyc—Lycoming
Nort—Northway
Walk'r—Walker
Weid—Weidely

CARBURETOR

Ball & B—Ball & Ball
Till—Tillotson
Strom—Stromberg
Y & T—Yale & Towne

CLUTCH

f-d—Friction drive
c—Cone
m-d—Multiple disc
s-p—Single plate
B & B—Borg & Beck
B-L—Brown-Lipe
North—Northway

STARTING, LIGHTING IGNITION

A-L—Auto Lite
G-D—Gray & Davis
L-N—Leece Neville
N. E.—North East
West—Westinghouse

GEARSET

f-d—Friction Drive
B-L—Brown-Lipe
G-L—Grant-Lees
Mech—Mechanics
North—Northway

UNIVERSAL

f—fabric
m—metal
M &E—Merchant & Evans
Mech—Mechanics

REAR AXLE

F—Floating
½ F—Semi-Floating
¾ F—Three-Quarter Floating
Col—Columbia
Salis—Salisbury
Std—Standard
Tim—Timken

(Continued on page 56)

S T A N D A R D O F T H E W O R L D

The enviable prosperity of Cadillac Dealers has a firm foundation. It is based solidly on the intense satisfaction of Cadillac owners, and this, in turn, is founded on the careful craftsmanship and precision methods in the Cadillac plant, which definitely secure Cadillac leadership.

CADILLAC MOTOR CAR COMPANY, DETROIT, MICHIGAN
Division of General Motors Corporation

CADILLAC

A new Booklet entitled "The Factory and the Dealer" will be mailed you free upon request

Specifications of Current Passenger Car Models

PRICES 2-Pass.	5-Pass.	7-Pass.	Sport	Coupe	Sedan	Wheel Base	Tires	Engine Make	Cylinders: Bore and Stroke	Rated Horse Power (N.A.C.C.)	NAME AND MODEL	Carbureter	Starting and Lighting	Ignition	Clutch: Type and Make	Gearset	Universal: Type and Make	Rear Axle: Type and Make	†Gear Ratios
$3985	$4090c	$4090	.....	$5500	$5500	132	33x5	Own..	8-3¼x5¼	33.80	LaFayette	Johnson	Delco	Delco	m-d Own	Own	m Own	F Own	4.58
5500	5500	5500	.....	5500	5500	134	32x4½	Own..	6-3½x5¼	33.75	Leach....999	Rayfield	Delco	Delco	m-d	Own	m,f	Tim	
1695	(1695	(1795	$2045d	2345c	(2545d	123	32x4½	Anst..	6-3¼x4½	25.35	Lexington....23	Rayfield	G-D	Conn	m-d Ansted	Warner	f Snead	¾F Own	5.10
	(1995	(2095			(2145d														
1575	1395	.....	1575	(2085	2245	117	32x4	Own..	6-3½x5	23.44	Liberty....10-D	Strom	Wagner	Wagner	s-p B&B	Detroit	m Spicer	½F Tim	4.80
				(1695k															
3800	3800c	3800	.....	4400d	4700d	136	33x5	Own..	8-3½x5	36.45	Lincoln	Strom	Delco	Delco	m-d Own	Own	m Spicer	F Tim	4.58
.....	7600c	7600	.....	10500	11000	142	35x5	Own..	6-4½x5½	48.60	Locomobile....48	Ball&B	West	Delco	m-d Own	Own	m Own	F Own	3.50
3385	3185c	3185	.....	3985	4385	136	32x4½	Own..	6-3¼x5⅛	33.75	Marmon....34	Strom	Delco	Delco	m-d Own	Own	m Spicer	¾F Own	3.75
885	885	.....	.....	(985	1335	109	31x4	Own..	4-3½x4½	21.03	Maxwell	Stewart	A-L	Simms	c Own	Own		¾F Own	4.56
				(1235															
6300	6300c	6300	.....	7500	7500	140	33x5	Own..	6-4½x6	48.60	McFarlan....1922	Rayfield	West	Splitdorf	s-p B&B	B-L	m Peters	F Tim	3.50
3950	3950c	3950c	.....	4850	5250	132	32x4½	Own..	4-3½x6¾	22.50	Mercer....Series 5	Ball&B	West	Eisemann	m-d Own	Own	m Spicer	F Own	3.87
.....	3750	3750	.....	5000	5000	132	32x4½	Own..	6-3¾x5	33.75	Mercer....6	Strom	.....	Eisemann	.....	.....	.....	¾F	3.77
1895	1895	.....	.....	.....	.....	119	32x4	Cont..	6-3¼x4½	25.35	Merit	Strom	Delco	Delco	s-p B&B	Muncie	f Snead	F Col	4.60
1490b	1590	.....	1850c	2050c	2275d	120	32x4	Own..	6-3½x5	29.40	Mitchell....F-50	Strom	Remy	Remy	s-p B&B	Own	m Own	F Own	4.42
.....	.....	1690	.....	.....	.....	127	32x4½	Own..	6-3½x5	29.40	Mitchell....F-50	Strom	Remy	Remy	s-p B&B	Own	m Own	F Own	4.42
950	950	.....	.....	.....	.....	115	32x4½	Own..	4-3¼x4½	16.90	Monroe....1922-S-9	Zenith	A-L	Conn	m-d Own	Mech	m Universal	¾F Own	5.30
1295	1195	p1445d	1885c	1585c	1695	115	31x4	Cont..	6-3½x4½	23.44	Moon....6-40	Strom	Delco	Delco	s-p B&B	Warner	m Spicer	½F Tim	4.80
1785	1785	1785	1885	2785	(2785f	128	33x4½	Cont..	6-3⅝x4½	27.34	Moon....6-58	Strom	Delco	Delco	B&B	B-L	m Spicer	½F Tim	5.09
					(2485c														
1210	1240	.....	1395c	.....	2040d	121	33x4	Own..	6-3¼x5	25.35	Nash....691-96-97	Marvel	Delco	Delco	s-p B&B	Own	m Own	½F Own	4.50
.....	.....	1390	1645	1890c	2190f	127	34x4½	Own..	6-3½x5	25.35	Nash....692-94-95	Marvel	Delco	Delco	s-p B&B	Own	m Own	½F Own	4.50
915	935	.....	.....	(1385b	(1545d	112	33x4	Own..	4-3⅝x5	18.23	Nash Four....41-4	Schebler	Delco	Delco	s-p B&B	Own	m Own	½F Own	4.88
				1195k	1275k														
2475b	2475c	(2375	.....	3250c	3825f	130	32x4½	Own..	6-3½x5¼	29.40	National....BB	Rayfield	West	Delco	s-p B&B	B-L	m Arvac	F Col	4.08
		3150		3725c															
2500	2500c	2600c	.....	.....	3500d	128	32x4½	Cont..	6-3¼x4½	25.35	Noma....3C	Claudel	Delco	Delco	s-p B&B	Detroit	m Spicer	½F Tim	4.45
3000	3100c	3200c	.....	.....	5500	128	32x4½	Bea..	6-3½x5¼	29.40	Noma....1D	Zenith	Delco	Delco	s-p B&B	Detroit	f Spicer	½F Tim	4.45
.....	1035	.....	.....	.....	.....	116	32x3½	Lyc..	4-3½x5	19.60	Norwalk....430-KS	Zenith	Dyneto	Delco	s-p B&B	G-L	m Universal	¾F Col	5.00
975	995	795g	1165c	(1445d	1545	115	32x4	Own..	6-2¹³⁄₁₆x4¾	18.99	Oakland....6-44	Marvel	Remy	Remy	c Own	Muncie	m Mech	F Own	4.33
				(1185a															
3750c	3750	3850	3750c	4500c	4800f	134	33x5	Cont..	6-3⅝x5¼	31.51	Ogren....6 T D Luxe	Rayfield	Bosch	Bosch	m-d B-L	B-L	m	F Col	4.00
955	975	1350d	1075	1475	1595	115	32x4	Own..	4-3¹¹⁄₁₆x5¼	21.86	Oldsmobile....43 A	Zenith	A-L	Remy	s-p B&B	Warner	m Own	¾F Own	4.33
1735c	1850e	1735	.....	.....	.....	122	33x4½	Own..	8-2¼x4¾	26.45	Oldsmobile....46	Ball&B	Delco	Delco	c Own	Warner	m Own	¾F Own	4.93
1625c	1375	.....	1675	1875	2025	115	32x4	Own..	8-2¼x4½	26.45	Oldsmobile....47	Johnson	Delco	Delco	s-p B&B	Warner	m Spicer	¾F Own	5.10
525	525	.....	425g	795	875	100	30x3½	Own..	4-3⅝x4	18.23	Overland....4	Till	A-L	Conn	s-p B&B	Own	m Own	½F Own	4.50
2485	2485	2250g	.....	3175	3275	126	33x4½	Own..	6-3⅝x5	27.34	Packard....Single-Six	Own	A-K	Delco	m-d Own	Own	f Spicer	½F Own	4.30
.....	2350g	2685	.....	.....	3525	133	33x4½	Own..	6-3⅝x5	27.34	Packard....Single-Six	Own	A-K	Delco	m-d Own	Own	f Spicer	½F Own	4.66
3850	3850	3850	.....	5240	5400	136	35x5	Own..	12-3x 5	43.20	Packard....Twin-Six	Own	Bijur	Delco	m-d Own	Own	m Spicer	½F Own	4.36
1465	1465	1290g	.....	1995	2245	119	32x4	Own..	6-3¼x5	25.35	Paige....6-44	Strom	Remy	A-K	s-p Long	Own	m Universal	¾F Salis	4.75
2495b	.....	2195	2245	3100	3155	131	33x4½	Cont..	6-3⅝x5	33.75	Paige....6-66	Rayfield	Remy	A-K	s-p Long	Warner	m Mech	¾F Tim	4.60
.....	1390	1425	.....	2395	2395	120	32x4½	Cont..	6-3⅝x4½	27.34	Paterson....22-6-52	Strom	Delco	Delco	s-p B&B	Durston	m Hartford	½F Std	4.50
.....	2990c	2990	.....	(3300a	(3990d	128	33x5	Own..	8-3¼x5	33.80	Peerless....23	Ball&B	Delco	Delco	m-d Own	Own	M Spicer	¾F Tim	4.90
				3400c	4090f														
5250	5250c	5250	.....	6800	(6900	138	33x5	Own..	6-4 x5½	38.40	Pierce-Arrow	Own	Delco	Delco	m-d Own	Own	m Spicer	½F Own	3.93
					700														
2050	2000	2050	.....	2950	3000	126	32x4½	H-S..	6-3¼x5	25.35	Pilot....6-50	Till	Bijur	Conn	s-p B&B	Muncie	m Hartford	¾F Col	4.33
3150	3100c	3250	.....	4300	5100	126¾	32x4½	Own..	6-3⅝x5½	27.34	Premier....6-D	Johnson	Delco	Delco	s-p B&B	Own	m Spicer	¾F	4.58
1095	1095	.....	.....	1750	1825	117	32x4	Falls..	6-3½x4¼	23.44	Premocar....6-40-A	Strom	Wagner	Wagner	s-p B&B	Mech	m Spicer	¾F	4.66
.....	1665	.....	.....	2385	2475	116	32x4	Own..	4-3⅝x5	22.50	R & V Knight....R	Strom	Wagner	Wagner	s-p B&B	B-L	m Spicer	F Salis	4.75
2475	2475c	2475	.....	3015	3105	127	32x4½	Own..	6-3½x4½	29.40	R & V Knight....J	Strom	Wagner	Wagner	s-p B&B	B-L	m Spicer	½F Tim	4.90
1595	1645	1485	1745	(2355c	(2435f	120	33x4	Own..	6-3 1/16x5	24.34	Reo....T6 & U6	Rayfield	N.E	N.E	m-d Own	Own	m,f Own	½F Own	4.70
				1835	1885														
3200	3200	3200	.....	.....	4000	131	32x4½	Ducs..	4-4¼x6	28.90	ReVere....C	Strom	West	Bosch	m-d B-L	B-L	m Spicer	¾F Std	4.00
.....	1485	.....	.....	1885	1985	117	32x4	Own..	6-3½x4¾	23.44	Rickenbacker....A	Strom	Simms	A-K	c Own	Own	m Universal	¾F Own	.....
2685	2485c	2685	.....	3585	3585	128	32x4½	Cont..	6-3½x5¼	29.40	Roamer....6-54-E	Strom	Bijur	Bosch	s-p G-L	G-L	f Snead	½F Tim	4.88
3785	3485	3650c	3650c	.....	4650c	128	32x4½	Dues..	4-4¼x6	28.90	Roamer....4-75-E	Strom	Bijur	Splitdorf	m-d B-L	B-L	f Snead	½F Tim	3.77
	10900	.....	.....	.....	.....	143½	35x5	Own..	6-4½x4¾	48.60	Rolls-Royce	Own	Bijur	Bijur	c Own	Own	m Own	F Own	3.25
1195	1195	.....	.....	1795	1795*	112	32x4	Own..	4-3½x5	19.60	Saxon....125	Strom	Wagner	Wagner	s-p Detlaff	Covert	m Peters	¾F	4.75
1645	1645	.....	.....	2645	2645	118	33x4	Cont..	6-3½x4½	25.35	Sayers Six....DP	Strom	Delco	Delco	s-p B&B	G-L	m Arvac	½F Std	4.75
875	875	.....	.....	.....	.....	108	30x3½	Lyc..	4-3½x5	19.60	Seneca....L-2 & O-2	Zenith	A-L	A-L	s-p B&B	G-L	m Universal	F	4.75
1095	1095	.....	.....	.....	.....	112	31x4	Lyc..	4-3½x5	19.60	Seneca....50 & 51	Zenith	A-L	A-L	s-p B&B	G-L	Detroit	F	4.50
980	980	.....	.....	1685	1685	114	32x4	Supr..	4-3⅜x5	18.23	Sperling....A	Zenith	Bijur	Splitdorf	s-p B&B	Warner	m Hartford	¾F Peru	.....
2150	.....	2395	2395	2750	3200	127	34x4½	Own..	8-3¼x5	33.80	Standard....98	Zenith	West	Splitdorf	s-p B&B	G-L	m Arvac	½F Tim	4.45
2750	2750	2750	2425g	3950c	3985f	130	32x4½	Own..	2-4 x5	.....	Stanley....740	None	Bijur	None	None	None	None	½F Own	1.50
1765	1765	.....	.....	2750	.....	118	33x4	Cont..	6-3¼x4½	25.35	Stanwood Six	Strom	West	A-K	s-p B&B	G-L	m Peters	½F Std	4.50
319r	348s	285g	.....	580	645	102	30x3½	Cont..	4-3½x4¼	15.63	Star	Till	A-L	A-L	s-p		Spicer	Tim	4.87
2250	2250	2450	.....	3150	3450	125	34x4½	Own..	4-3⅜x5⅝	22.50	Stearns-Knight....SKL4	Rayfield	West	A-K	m-d Own	Own	f Climax	½F Own	4.50
2700	2700	2850	.....	3500	3700	130	34x4½	Own..	6-3⅜x5	27.34	Stearns-Knight....:6	Rayfield	West	A-K	m-d Own	Own	f Climax	½F Own	4.50
1575	1565e	1625c	.....	2450	2550	122	33x4½	Own..	6-3¼x4½	25.35	Stephens....90	Till	A-L	A-L	s-p B&B	Mech	m Mech	½F Tim	4.90
7250	6900e	6800	(6900c	8600	8900c	138	35x5	Own..	6-4 1/16x5½	47.27	Stevens-Duryea....E	Strom	West	Berling	m-d Own	Own	m Own	F Own	3.94
			(5600g																
975	975	785g	.....	1225	1550	112	32x4	Own..	6-3¼x4½	23.44	Studebaker....Light Six	Strom	Wagner	Wagner	s-p Own	Own	f Thermoid	½F Own	4.55
(1250	1275	1275c	1000g	1875	2050	119	32x4	Own..	6-3½x5	29.40	Studebaker..Special Six	Strom	Wagner	Wagner	s-p Own	Own	m Spicer	½F Own	4.00
(1275c																			
1300g	1650	.....	1785	2275	2475	126	33x4½	Own..	6-3⅞x5	36.01	Studebaker....Big Six	Ball&B	Wagner	Wagner	s-p Own	Own	m Spicer	½F Own	3.70
2450	(2790c	(2640c	2670a	3490	4450	130	32x4½	Own..	4-4⅜x6	30.63	Stutz....KLDH	Strom	Remy	Delco	m-d Warner	Own	m Hartford	½F Own	3.50
	(3165c	(3015																	
2025	2125	2175c	.....	2650c	2785	118	32x4	Own..	4-3⅜x5½	18.23	Templar....A-445	Strom	Bijur	Simms	s-p B&B	Detroit	f Snead	½F Us	4.40
1175	1175	.....	.....	.....	.....	117	33x4	H-S..	4-3½x5	19.60	Tulsa....E-1-2-3	Zenith	Dyneto	Conn	s-p B&B	Muncie	m	F Salis	4.50
1275	1275	.....	1305	1785	1785	115	32x4	Own..	6-3¼x4½	23.44	Velie....58	Strom	West	A-K	s-p Dooley	Durston	m Thiemer	¾F Own	4.66
.....	1990f	1890	.....	.....	2890	125	32x4½	Cont..	6-3½x5¼	29.40	Westcott....D-48	Rayfield	Delco	Delco	s-p B&B	B-L	m Peters	½F Tim	4.45
.....	1690	.....	1890	.....	2690	120	32x4	Cont..	6-3¼x4½	25.35	Westcott....B-44	Rayfield	Delco	Delco	s-p B&B	Warner	m Peters	½F Col	4.33
2475	2475	.....	.....	3275	3475	121	32x4½	Own..	8-3¼x4	33.80	Wills Sainte Claire..A-68	Zenith	Delco	Delco	m-d Own	Own	m Mech	¾F Own	4.45
1235	1235	1375	.....	1795	1950	118	32x4	Own..	4-3⅝x4½	21.03	Willys-Knight....20	Till	A-L	A-L	m-d Own	Own	f Own	¾F Own	4.44
3400	.....	3400	3600	4000	4550	132	33x5	Own..	6-3⅜x5¼	33.75	Winton....40	Rayfield	Delco	Delco	m-d Warner	Warner	f Climax	¾F Tim	4.68

MISCELLANEOUS
a—2 Passenger, d—5 Passenger
b—3 Passenger, e—6 Passenger,
c—4 Passenger, f—7 Passenger
g—Chassis Price,
h—All Metal Type,
k—Soft Top Type,
n—Tire Size 32x4½,
p—Sport.
r—Price without starter and demountable rims. Price, complete, $414.
s—Price without starter and demountable rims. Price, complete, $443.
†Standard Phaetons.

ENGINE
Anst—Ansted
Bea—Beaver
Cont—Continental
Dues—Duesenberg
H-S—Herschell-Spillman
Lyc—Lycoming
Supr—Supreme

CARBURETOR
Ball & B—Ball & Ball
Till—Tillotson
Strom—Stromberg

STARTING, LIGHTING IGNITION
A-L—Auto Lite
G-D—Gray & Davis
L-N—Leece Neville
N. E.—North East
West—Westinghouse

CLUTCH
c—Cone
f-d—Friction drive
m-d—Multiple disc
s-p—Single plate
B & B—Borg & Beck
B-L—Brown-Lipe

GEARSET
f-d—Friction Drive
B-L—Brown-Lipe
G-L—Grant-Lees
Mech—Mechanics

UNIVERSAL
f—fabric
m—metal
M&E—Merchant & Evans
Mech—Mechanics

REAR AXLE
F—Floating
½ Floating—Semi-Floating
¾ F—Three-Quarter Floating
Col—Columbia
Salis—Salisbury
Std—Standard
Tim—Timken

Price changes: Studebaker—7 passenger phaeton, $1785; 4 passenger sport phaeton, $1835; 4 passenger coupe, $2400; 5 passenger, $2550; Sedan (regular), $2475; Sedan (special), $2750.